NOVEMBER 4, 1961

Chemical Week

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Polyethylene film picture recast by rash of vertical integrations p.41

Charlotte, N.C. —specialties boom town of the Southeast p.48

CPI boardrooms beckon 'outside' directors. Behind the trend p.67

New twist in mixers. Novel unit halves mixing time and energy p.167

Piecing together the '61 pattern. Special Report . . p.105

STEVENS RICE GS CH
UNIVERSITY MICROFILMS IN
313 N 1ST ST
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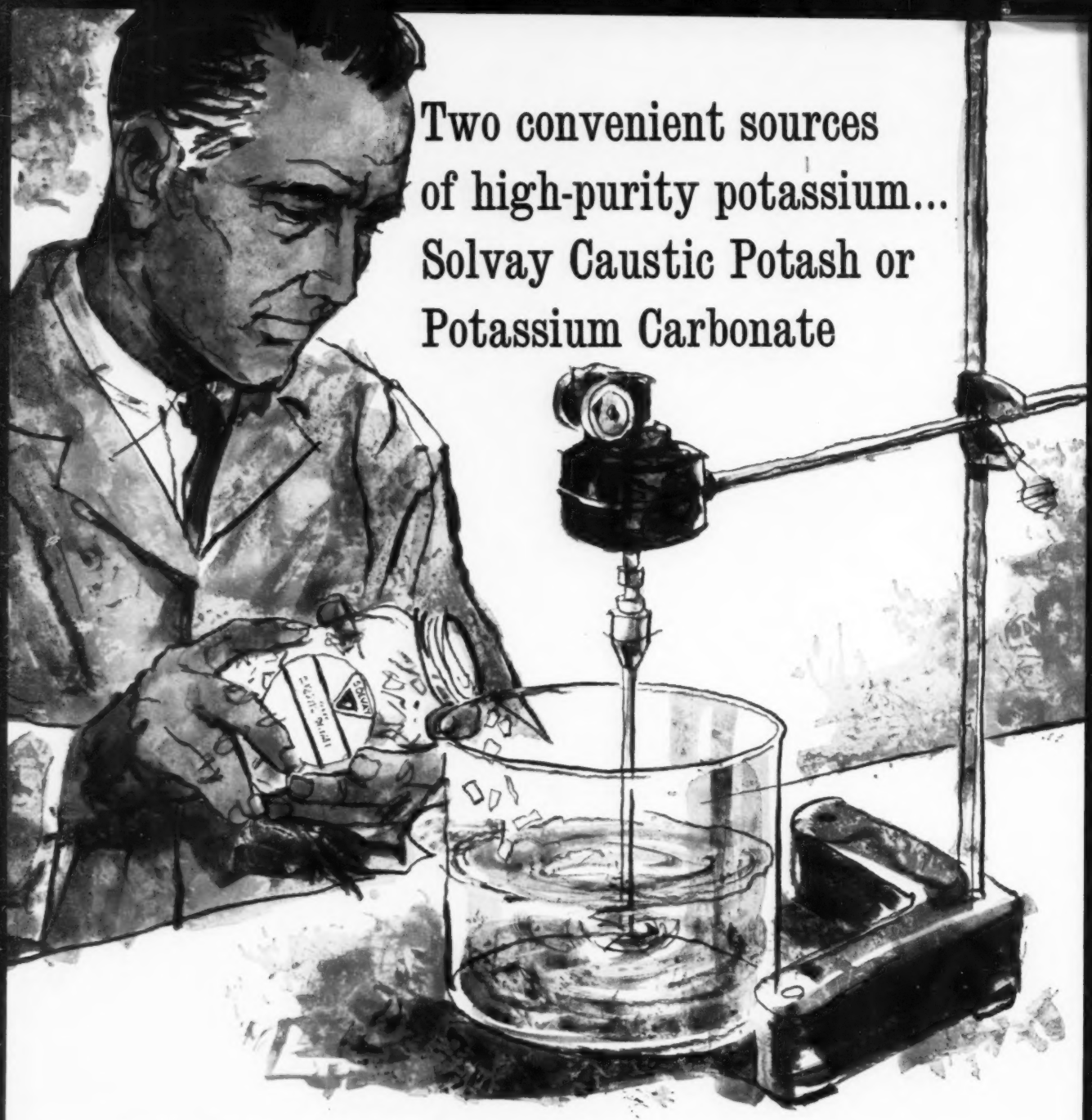

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ON THE COVER: A pattern symbolizing CPI growth in '61 (see Special Report, p. 105) is formed by workmen installing colorful enameled aluminum panels on new building. Alcoa photo.

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Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., James H. McGraw (1860-1948), founder. EXECUTIVE, EDITORIAL, CIRCULATION AND ADVERTISING OFFICES: McGraw-Hill Building, 330 West 42nd St., New York 36, N. Y. Telephone, LO 4-3000; Teletype, TWX N.Y. 1-1636; Cable, McGRAWHILL, N.Y. Place of publication: Philadelphia, Pa. Second class postage paid at Philadelphia. (See below for directions regarding subscriptions or change of address.) OFFICERS OF THE PUBLICATIONS DIVISION: Nelson L. Bond, president; Shelton Fisher, Wallace F. Traendly, senior vice-presidents; John R. Callaham, vice-president and editorial director; Joseph H. Allen, vice-president and director of advertising sales; A. R. Venezian vice-president and circulation coordinator; Daniel F. Crowley, vice-president and controller. OFFICERS OF THE CORPORATION: Donald C. McGraw, president; Hugh J. Kelly, Harry L. Waddell, executive vice-presidents; L. Keith Goodrich, executive vice-president and treasurer; John J. Cooke, vice-president and secretary.

United States and United States possessions subscription rate for individuals in the field of the publication, $3 per year; single copies, 50¢. Foreign subscription rates per year: Canada, $4; other Western Hemisphere countries, $15; all others, $25, payable in advance. Printed in U.S.A. Title registered in U.S. Patent Office,

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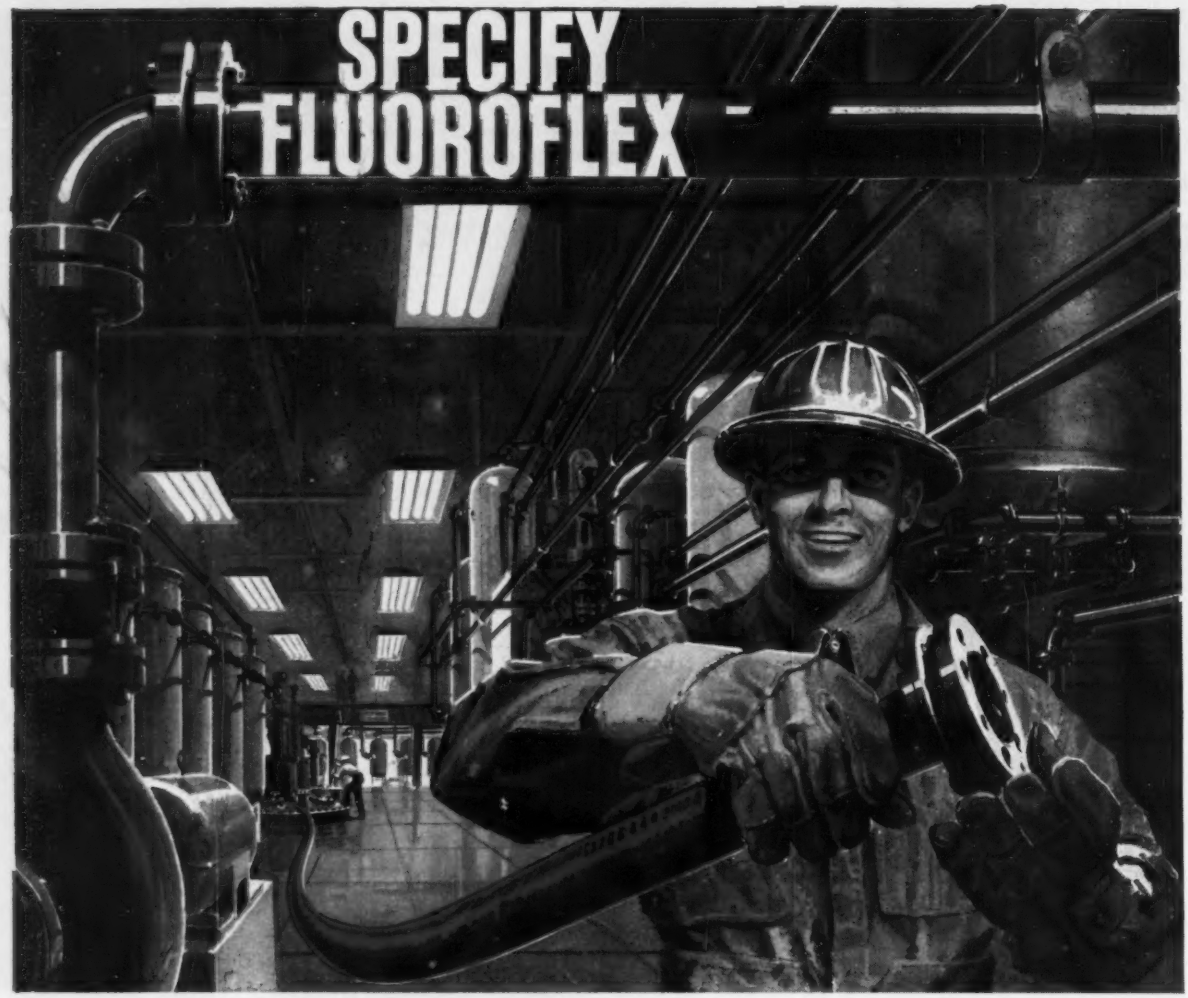

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The Case for Stock Options

INTERNATIONAL MINERALS & CHEMICAL'S success in getting stockholders' approval of a deferred compensation plan for directors (*see p. 67*) recalls another campaign that IMC Board Chairman Louis Ware and President Thomas Ware are still waging—the battle in behalf of stock options. This controversy was the subject of Senate Finance Committee hearings last July and has been stimulus for editorial comment, pro and con, since.

Although this issue won't be resolved until possibly next year, when a tax reform bill goes to Congress, the lively debate continues over whether stock options are good or bad. Considering that 61% of the 1,135 firms with common stock listed on the New York Stock Exchange have some form of stock option, such discussion is hardly academic.

"Restricted" stock options, which since '50 have received preferential tax treatment under a special provision in the Internal Revenue Code, are the main target of attacks. Sen. Albert Gore (D., Tenn.) argues for repeal of this law, which allows capital gains treatment of optioned stock. To get this tax advantage, an executive typically is given the right to buy his company's stock at a price somewhat less than the prevailing market level on the day the option is granted. Terms may provide that the option will not be exercisable for, say, three years and will expire after five years.

The idea of stock options is to keep capable men in a company, reward high-tax-bracket individuals with something they can keep. No tax is payable until the stock is sold, provided the code's holding period requirements are met; then the maximum tax is a 25% capital gains tax.

Of course, all this is predicated on the stock's increasing in value. Evaluating risk—figuring what to offer in the option, on the possibility the stock will go up a certain amount—is still a fascinating accounting problem. Anybody able to forecast the market accurately would be foolish to burn up brain matter in any other occupation.

Both Wares, and others, concede there are instances in which stock options are abused—that some companies offer too high a percentage of shares on option or show undue favoritism in bestowing options. But, as Louis Ware told the Senate, abuses of this nature are hard to control with laws. Thomas Ware observes, "If there are malpractices in the handling of stock option provisions, you can be certain that there are malpractices in other management areas. In these instances, it isn't the stock option that should be eliminated, but more likely it is the management."

J. A. Livingston, financial editor of the *Philadelphia Bulletin,* is one writer with no use for stock options. Scoring the right of executives to be taxed any differently from school teachers or newspapermen, Livingston expounds: "Few modern corporation executives build companies from scratch. They start in at big companies . . . and work their way up—through the legal department, accounting, sales or production. They show skills required by modern organization. . . . So their superiors select them to perpetuate . . . the enterprise.

"But note this, they take over existent economic power. The organization is there—complete from plant to sales. . . . These men, who have moved up to the executariat of corporations, ought to offer special thanks instead of extracting special benefits from society."

That's an argument Louis Ware, who helped run up IMC sales from $10 million in '39 to nearly $132 million in fiscal '61, must find hard to swallow.

How New Is CPS?

TO THE EDITOR: [Re] . . . the article on scheduling process plant projects (*Aug. 26, p. 50*). I was particularly interested in the statement that some contractors are now building plants 21-27% faster than they were three or four years ago. The article goes on to suggest that this improvement is general and is due to the use of design models and critical-path scheduling.

Since process design models have been in use for over 10 years, it is difficult to see how they can be a primary factor in current improvement. Critical-path scheduling is also far from being a new technique. The writer, and many other individuals in the industry, have used it for many years—controlling schedules by "key-items" or in current terminology, "items on the critical path." Recent, well-publicized additions to the technique have been the arrow diagram to represent time relationships and the use of the computer to handle the tedious arithmetic.

Good scheduling has always been a part of the stock-in-trade of the best contractors and client-owners. It has aided them in minimizing both plant costs and construction time. "Critical path" scheduling by computers has dramatically highlighted these benefits, perhaps calling them to the attention of organizations that previously overlooked them. Percentage improvement for a given company, or group of companies, is therefore inconclusive. Significant performance comparisons must be made on the basis of plots of actual project durations against some measure of project size.

The enclosed chart (*below*) from my article (*Chemical Engineering, April 3, '61*) is a plot of this type, showing results obtained by seven process companies during 1942-59, also data published by M. Mattozzi in '53. The chart is for field work only. It is plotted in terms of duration in months vs. field man-hours, including hours worked by all project personnel on the site. Duration is defined as the time from start of foundations to readiness for commissioning.

Recent checks indicate that leading engineer-contractors are now building process plants in times about as indicated by the curve marked "High priority." They are doing this, moreover, without the use of extensive overtime. This seems to confirm the general observation in your article that there has been an improvement in project completion time during recent years.

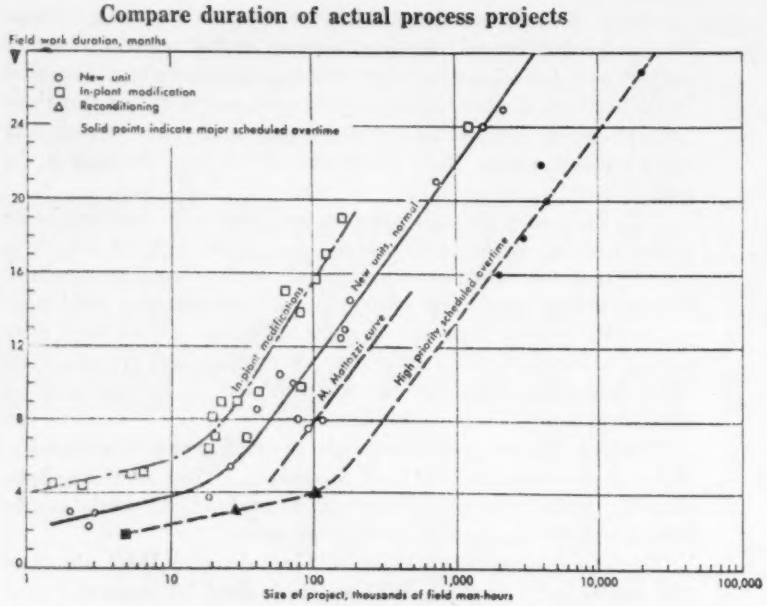
I am inclined to believe, however that this is a continuing improvement due to better project management and techniques in general, rather than the two very special techniques mentioned in the article. Efficient design and construction of modern process plants involves the services of hundreds of specialists, accustomed to acting as a coordinated team. Balanced attention to improvement in all project phases is required. The final objective is optimization of completion time with capital cost, operability, product quality, production cost and all of the other plant characteristics that affect profitability.

It would be quite helpful if your readers could add some factual data to this chart of field construction time. Also of interest would be information concerning the total project design and construction period, from contract award to readiness for commissioning.

JOHN W. HACKNEY
The M. W. Kellogg Co.
New York

SCHEDULING . . .

Compare duration of actual process projects



Arrow diagram is latest addition to critical-path scheduling.

We Plead Innocent

TO THE EDITOR: Re "Strong Words on Pricing" (*Sept. 30, p. 7*).

Probably nobody is ever 100% correct, but I'll certainly side with your anonymous correspondent who derides CHEMICAL WEEK for overdoing "pie-in-the-sky," overoptimistic, "plenty of room for all" market predictions; and giving "equal time" to pessimistic stories is certainly no justification. CHEMICAL WEEK, like all facets of the free press, carries a strong, moral obligation to its readers for its right to reach them—an obligation to help them, lead them, teach them — not simply please them. . . .

In the same issue in which your editorial appears, the article "Bullish in Foam" (*p. 98*) is almost certain to "seduce feather merchants into a reasonably well-balanced area," or at least [into] an industry in which the present members are already planning on handling the growth, and newcomers would only create still another plastics industry glut.

Why not devote your valuable space to discussion and solution of our industry's serious profit-price problems? Why not boldly step into the sticky price competition problem and help get a solution of the problem of how to have the same price without having

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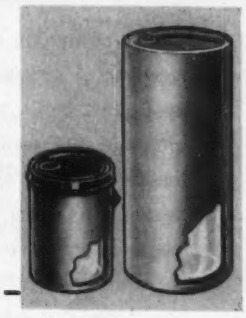

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Let's face reality squarely and solve our problems—stop living in a fairy-tale world or pie-in-the-sky business. Stop telling us what we like to hear—start serving us with what we ought to know.

BLAKE H. HOOPER
General Manager
Wilson-Martin Division
Wilson & Co., Inc.
Philadelphia

We agree with Reader Hooper on what CW should be doing, but we think we're already doing it. We believe we serve the industry's best interests by reporting the consensus of industry experts on future sales, capacities, operating rates and prices. Sometimes our sales estimates for several years hence have proved to be too high—but often they're too low.

Even if CW were 100% right all of the time, a smart management man should have something more than a CW forecast in his briefcase before asking his board of directors for a new plant. He should have some committed customers.—ED.

Beryllium Brainwash?

TO THE EDITOR: I read with a great deal of interest "The Beryllium Bubble" (*Oct. 7, p. 5*).

To a great extent, some of the facts are true; however, the article suggests that the person writing this Viewpoint had been thoroughly brainwashed by either one of the two large producers of beryllium metal.

If price is really not the problem, then why are these two companies trying so hard to keep other companies out of the picture who can and will bring the price down?

R. L. BENDER
Loveland, Colo.

We'll be glad to reconsider when we see a cost-cutting breakthrough in fabrication.—ED.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 West 42nd St., New York 36, N.Y.

Peroxygen Patents

TO THE EDITOR: Re the information contained in a letter to you headed "GE's Polyethylene Patents" (*Sept. 9, p. 7*) . . . the use of Lucidol's compounds containing 2,5-dimethyl-2,5-di(t-butylperoxy)hexane, Lupersol 101 and Luperco 101-XL, and 2,5-dimethyl- 2,5-di(t-butylperoxy)hexyne-3, Lupersol 130 and Luperco 130-XL for cross-linking polyethylene, is not covered by U.S. Patent 2,888,424.

R. M. BERRY
Manager
Commercial Chemical Development
Lucidol Division
Wallace & Tiernan Inc.
Buffalo, N.Y.

MEETINGS

Federation of Societies for Paint Technology, 39th annual meeting, Shoreham Hotel, Washington, D.C., Nov. 2-4.

Controllers Institute of America, 30th annual conference, Palmer House, Chicago, Nov. 5-8.

National Renderers Assn., 28th annual convention, Waldorf-Astoria Hotel, New York City, Nov. 5-8.

Symposium on Meteorological Air Pollution, U.S. Public Health Service Division of Air Pollution, Cincinnati, Nov. 6-7.

Chemical Institute of Canada, Chemical Engineering Division, Royal York Hotel, Toronto, Nov. 6-8.

Atomic Industrial Forum, eighth annual meeting in conjunction with American Nuclear Society, Conrad Hilton Hotel, Chicago, Nov. 6-8. ANS meeting Nov. 7-10.

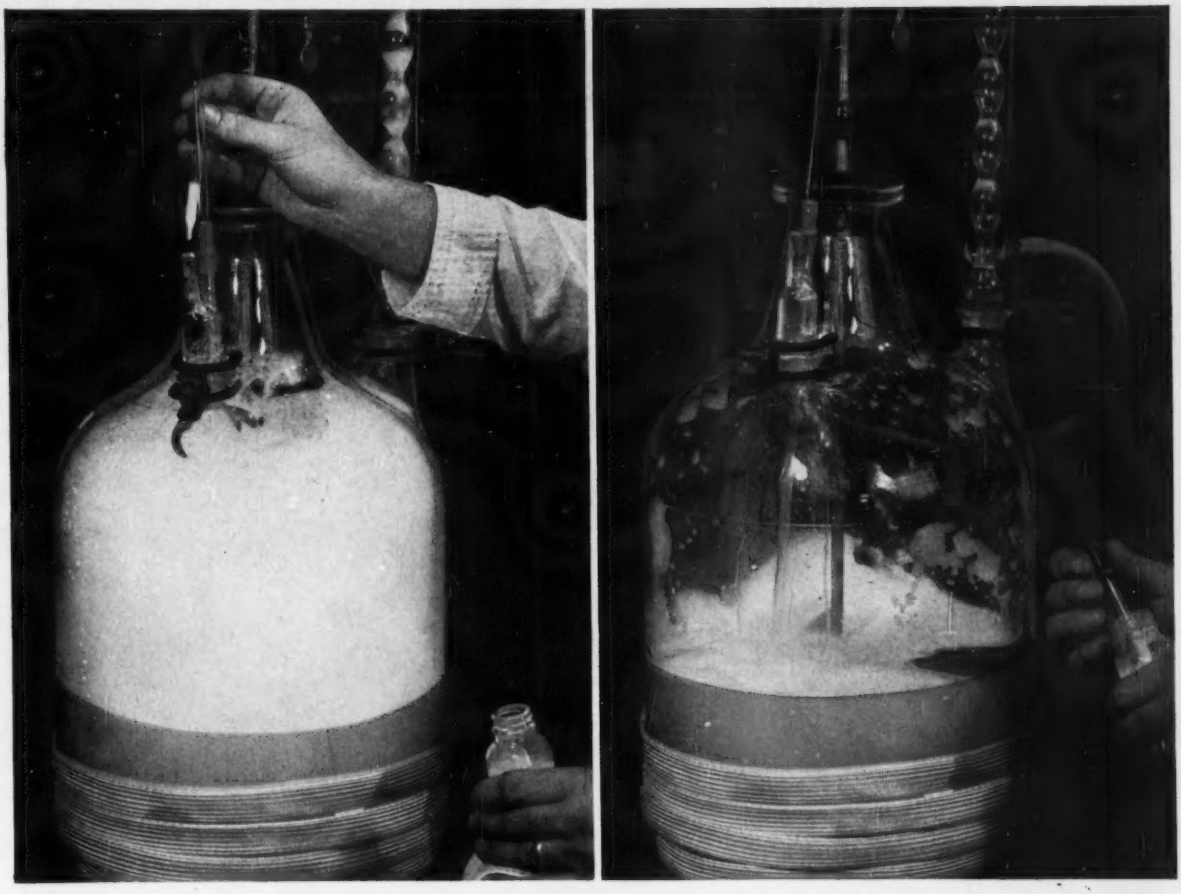
Atom Fair '61, Seventh Trade Fair of the Atomic Industry, Atomic Industrial Forum and American Nuclear Society, Conrad Hilton Hotel, Chicago, Nov. 6-9.

British Insecticide and Fungicide Conference, Assn., of British Manufacturers of Agricultural Chemicals, Brighton, England, Nov. 6-9.

Institute of Management Sciences, second American meeting, joint sessions with Operations Research Society of America, Jack Tar Hotel, San Francisco, Nov. 8-11.

SILICONE NEWS from Dow Corning

See How Foam Robs You



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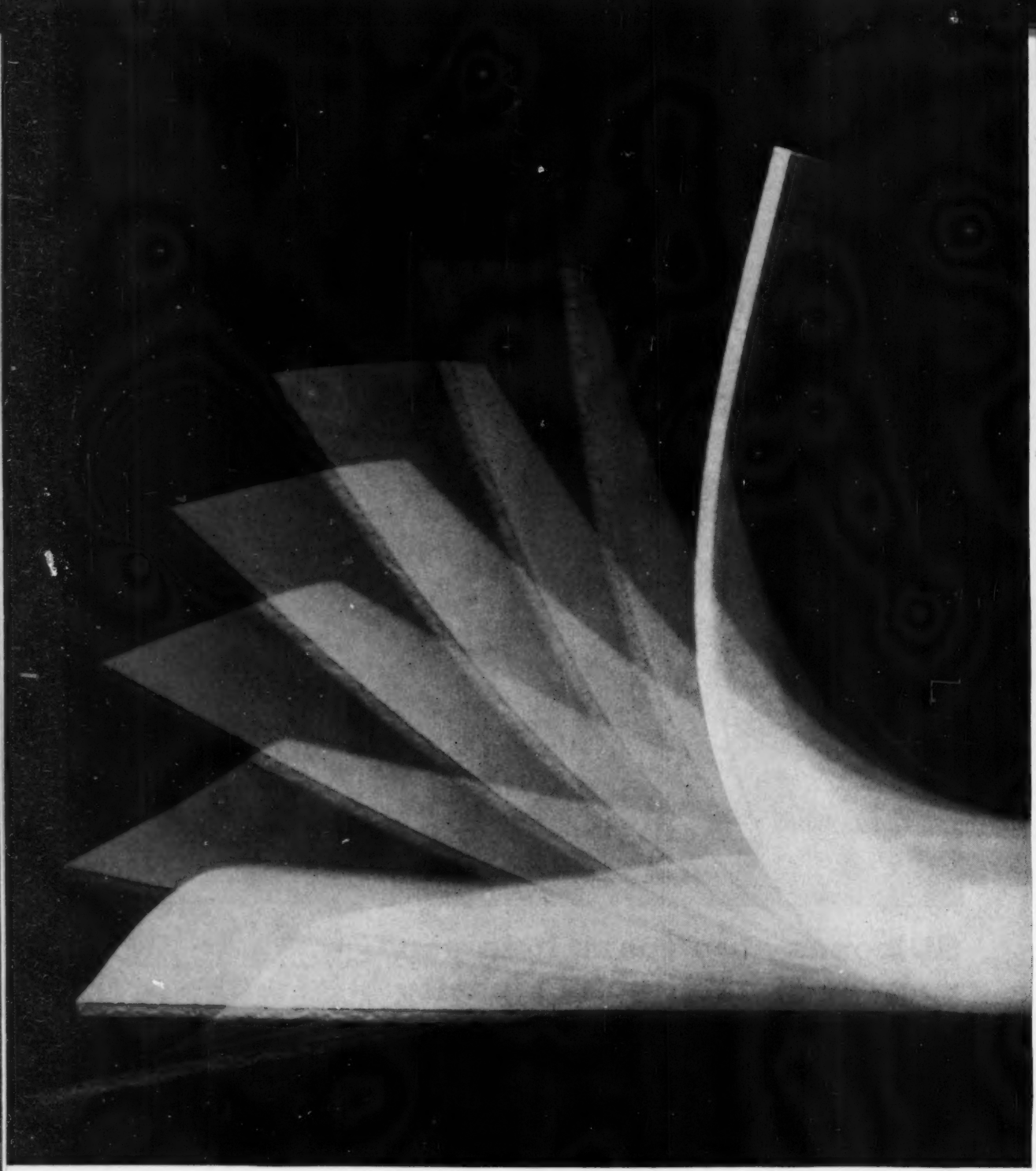
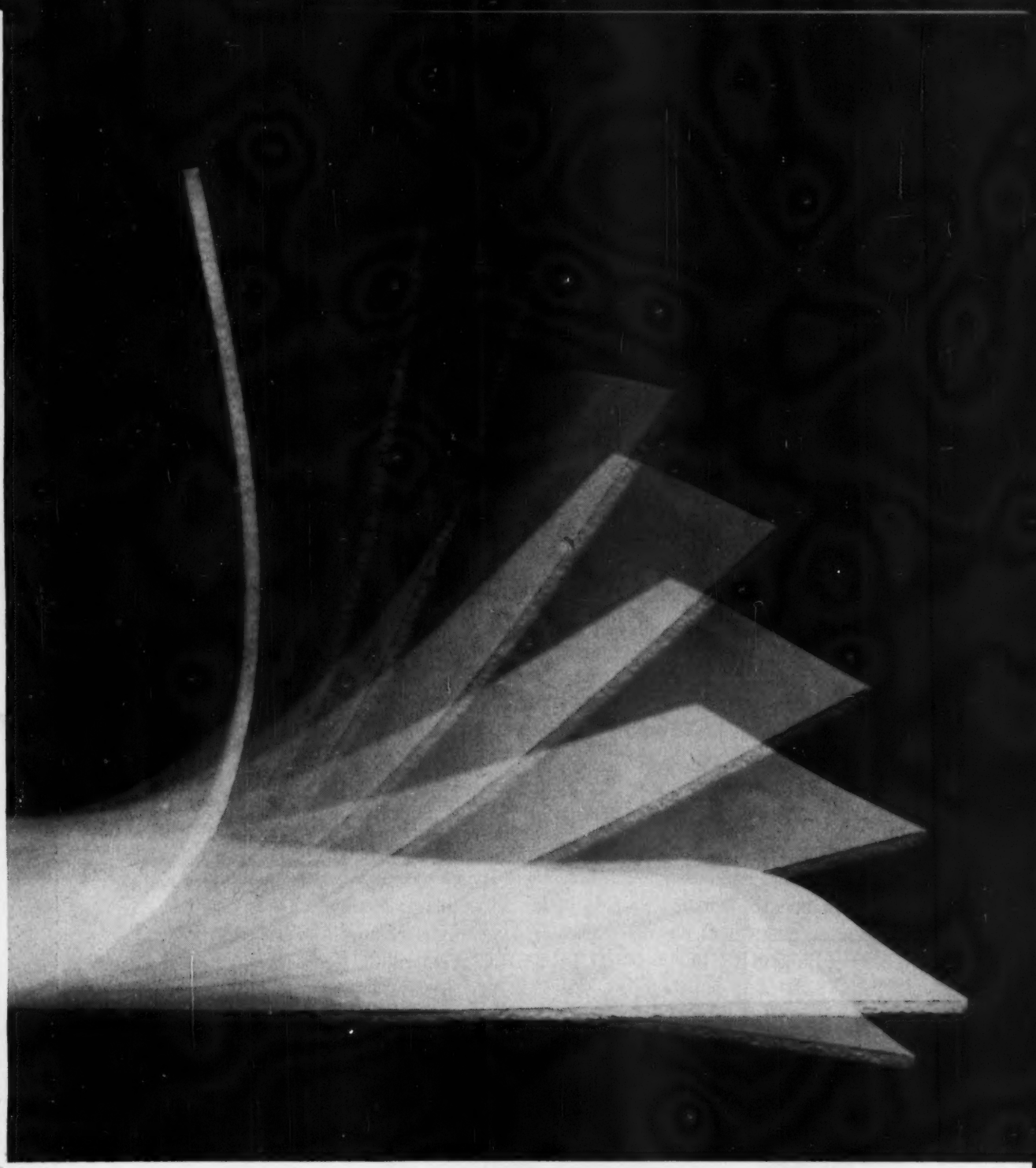


Why does vinyl bend?

Polyvinyl chloride, the resin used for vinyl floor tile, has extremely long, chainlike molecules whose points of high intermolecular attraction cause the chains to stick tightly together normally resulting in rigidity and brittleness. But the molecular chains in polyvinyl chloride can be "lubricated" by adding a plasticizer to the resin—smaller molecules which, like those in the resin, also have points of high intermolecular attraction. They occupy some of the areas of mutual attraction and thus break up the tight, chain-stuck-to-chain composition. The vinyl is then flexible and *plastic*, suitable for floor tile.

An excellent plasticizer used in vinyl resin is "Benzoflex 9-88," produced by the Tennessee Products & Chemical Corporation in Nashville. It has strong solvent action that permits lower processing temperatures, has good tensile strength and is compatible with other primary and secondary plasticizers. It is stable at processing temper-



atures and to subsequent exposure to light. It also adds to the stain resistance of vinyl floor tile.

To produce "Benzoflex 9-88"—dipropylene glycol dibenzoate—Tennessee Products & Chemical Corporation uses USS Toluene in the oxidation and esterification reactions. USS Toluene has the high purity and uniformity that meets TP&C's strict specifications. You can obtain the same high standards if you specify chemicals from United States Steel.

Chemical Sales Offices: Pittsburgh; New York; Chicago; Salt Lake City; Fairfield, Alabama.

Benzene • Toluene • Xylene • Phenol • Cresol • Cresylic Acid • Naphthalene • Creosote • Pitch • Picoline • Pyridine Ammonium Sulfate • Ammonium Nitrate • Anhydrous Ammonia • Nitric Acid • Nitrogen Solutions

USS TRADEMARK **Chemicals**

These Better Bellows Expansion Joints are Performance Rated

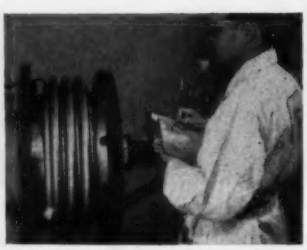
Every "TUBE-TURN" Bellows Expansion Joint rating certifies a definite cyclic life, ends the hazard of misleading "average" life warranties

Experienced piping engineers know it is risky to select bellows type expansion joints on "average" life warranties. They have often adopted more costly loop or offset pipe configurations just to be safe. This is no longer necessary. TUBE-TURN Bellows Expansion Joints have not only set new standards in design and performance, their certified cyclic life ratings end all guesswork and risk.

Everyone, piping designers, engineers and contractors, who have used TUBE-TURN performance-rated Bellows Expansion Joints *know* there is nothing like them on the market today. Be sure you have the facts on this new, better, lower-cost protection. Phone or write your nearest TUBE-TURN Bellows Expansion Joint specialists now. Also write us today for a copy of Bulletin TT 1035-L-143 TUBE TURNS, Louisville 1, Kentucky.

"TUBE-TURN" and "tt" Reg. U.S. Pat. Off.

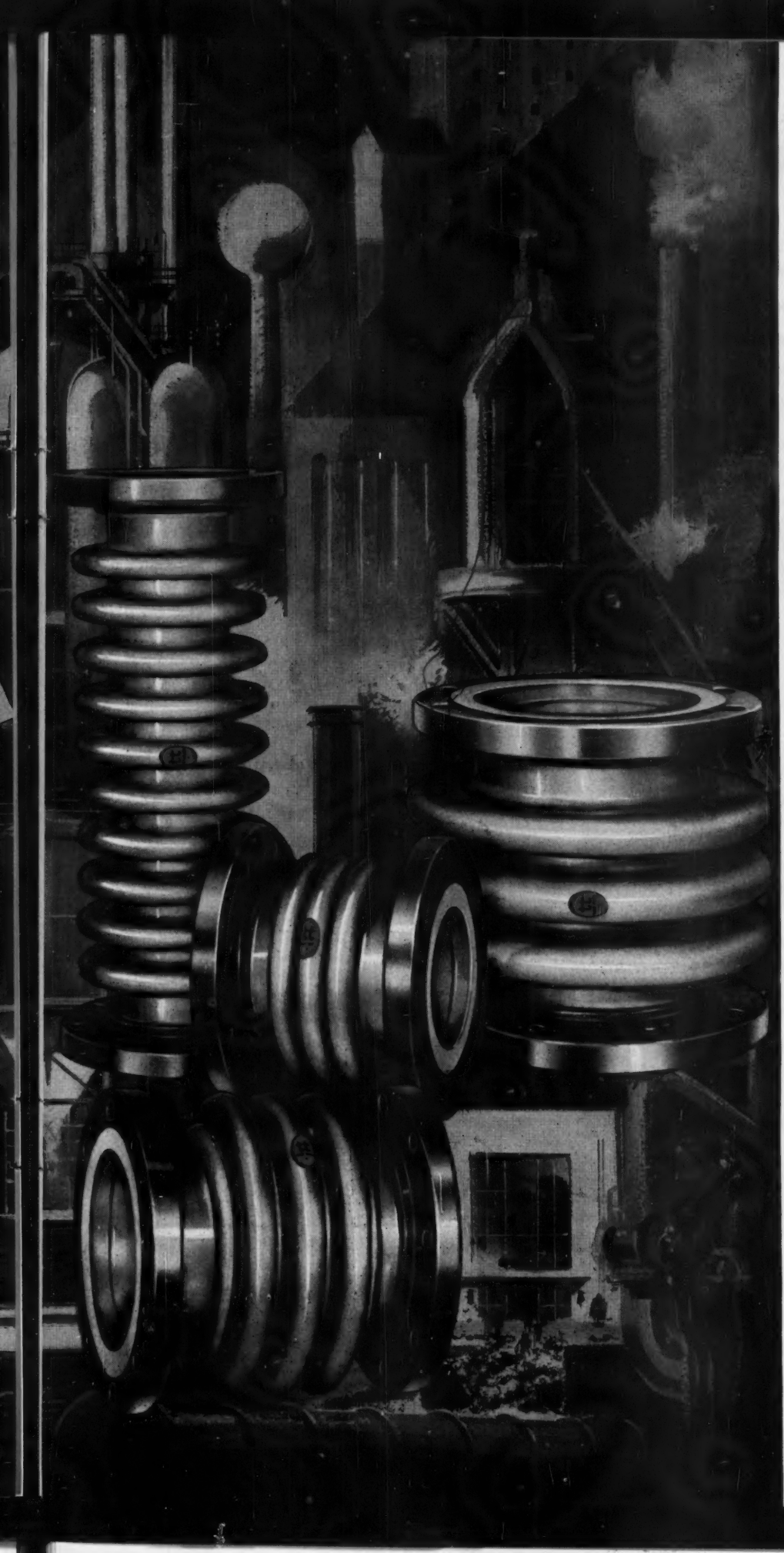
For better, lower-cost protection, specify TUBE-TURN Bellows Expansion Joints.



Cyclic life tests prove TUBE-TURN Bellows Expansion Joints have an average life of four times the minimum assured life.

TUBE TURNS

Division of CHEMETRON *Corporation*



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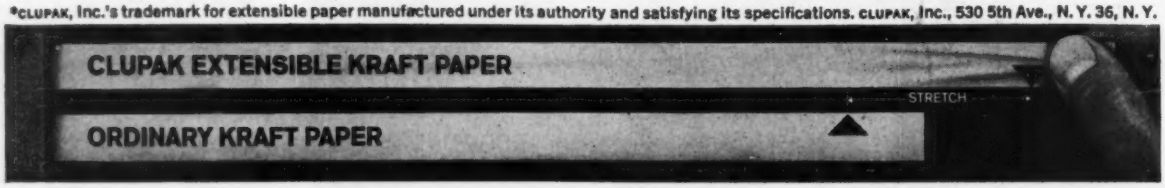

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Free from sulfur compounds and Thiophene, with extraordinarily low paraffin content and excellent color, Delhi nitration grade Benzene is a popular building block for production of plastics, synthetic fibers, detergents, pharmaceuticals, and a host of other finished products. Equally important, rigorous process control assures this quality from shipment to shipment. ■ Check your standards against Delhi's spec sheets. You'll find the quality of your own product fully protected or even improved by this Delhi high purity intermediate. Delhi Benzene, 5° Xylene, Toluene and other petrochemicals are available in barge, tank car, or tank truck shipments from Delhi's strategically located plants and bulk terminals. ■ Send for our Petrochemicals File

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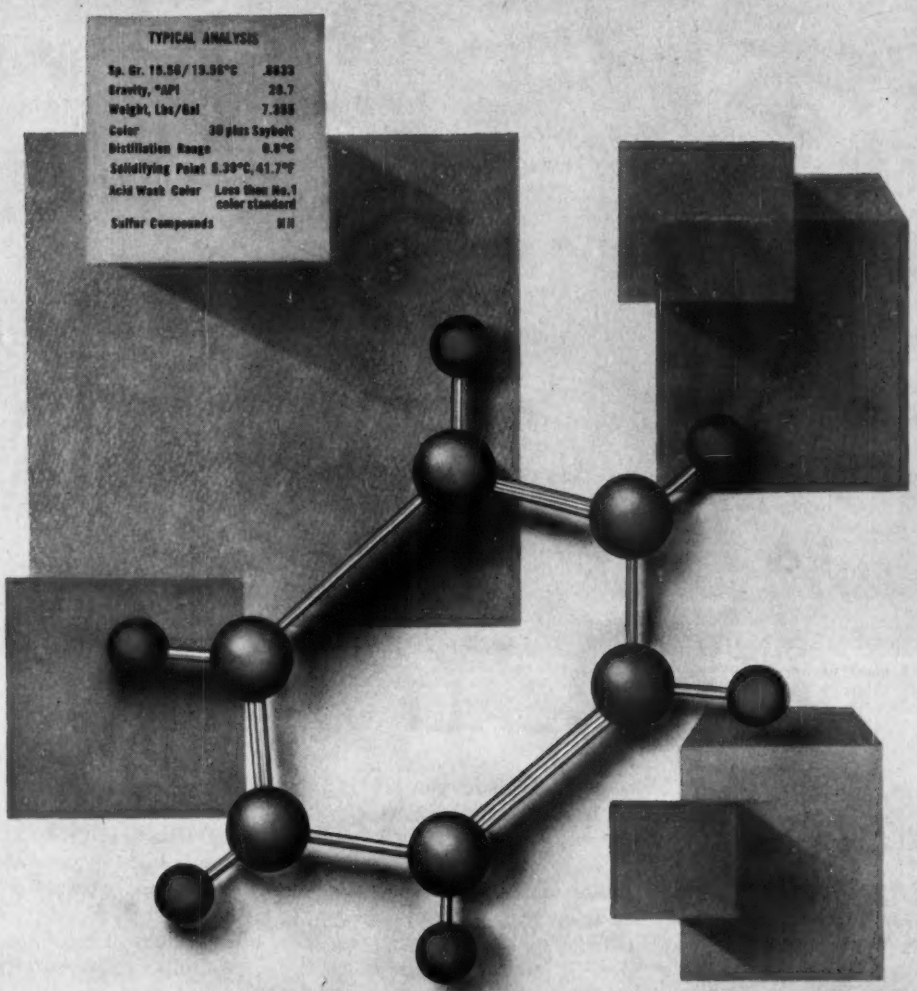

CHEMICAL DIVISION

DELHI-TAYLOR OIL CORPORATION

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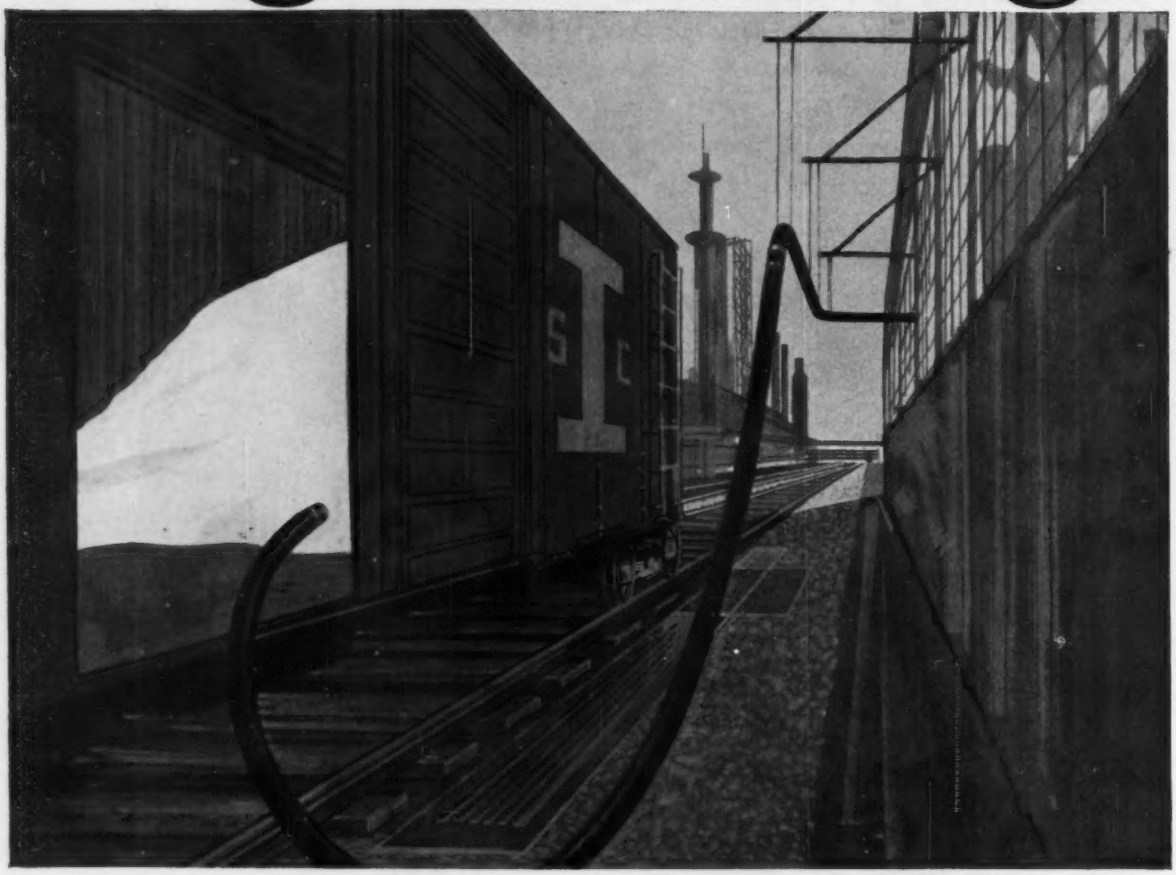
salt engineering



UNIQUE SALT AIRLIFT

Quick way to move salt at lowest cost

Until recently, a chemical plant unloaded boxcars of bulk salt with two-ton wheeled carts, hauled the salt to elevators and lifted the cart to the second story where the storage bin was located. 20 to 25 trips were necessary to unload a car. It was a continual, 8-hour operation.

Upon the recommendation of an International Salt Company Technical Service Representative, the plant installed a pneumatic handling system. Salt is sucked out of the cars and conveyed directly up into the storage bins ... *at a rate of 10 to 12 tons per hour*. It's fast, *automatic* . . . eliminates spilled salt and manual labor.

International also recommended changing to a type of salt having handling and storage characteristics specially suitable for this usage.

A leading supplier of salt to the chemical, food-processing and meat-packing industries, International is uniquely equipped to evaluate *your* salt operation. Even if you're satisfied with your present system, perhaps it *could* be improved. Why not review your operation with an International Salt representative? Salt is his business. He can make sure that you're taking advantage of the newest innovations in salt engineering. Write International Salt Company, Clarks Summit, Pa., or district office.

BOSTON CHARLOTTE CINCINNATI NEWARK NEW YORK PITTSBURGH
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INTERNATIONAL STERLING SALT SALT COMPANY

"A STEP AHEAD IN SALT TECHNOLOGY"

LOOK TO POWELL VALVES

You can count on Powell Valves for the answer to virtually any flow control problem where corrosion, erosion, temperature, or pressure are encountered. Because, at Powell, you'll find the largest selection of valves for the chemical industry.

For instance, only Powell offers you such a wide selection of materials—both ferrous and non-ferrous. This includes Stainless Steel, Nickel, Monel*, Hastelloy#, Ni-resist* and aluminum, just to mention a few.

Powell Corrosion-Resistant Valves are also rated up to 2500 pounds W.P. and for temperatures up to 1000F. For complete information and the answer to your corrosion, temperature or pressure problem, contact your nearby Powell distributor or write us directly.

*Registered trade names of The International Nickel Company.

#Registered trade name of Haynes Stellite Company.

150-pound W.P. Tank Valve. For mounting to bottom or side of vessel. Fig. 2309, disc opens into tank. Fig. 2310, disc opens into valve. Sizes, ½" through 8". Supplied in stainless steel, Monel, Nickel and other alloys. Available on special order in other sizes and pressures.

150-pound Stainless Steel Globe Valve, Fig. 2429. Outside screw rising stem and yoke, bolted flanged bonnet, integral seat. Available only with flanged ends. Sizes, 4" through 12". Angle valves of this design can be supplied on special order.

150-pound Steam Jacketed Gate, Globe, Lift and Swing Check Valves, Fig. 2800. Made especially to control the flow of heavy viscous media that require a heated jacket to keep them fluid. Shown, a Stainless Steel Gate Valve available with guided interchangeable solid or split wedge and integral seats. Sizes, 1" through 4".

Refer to our catalog in Chemical Engineering Catalog

Be sure and visit our Booth No. 133 at the 28th Exposition of Chemical Industries, New York Coliseum Nov. 27-Dec. 1.

115th year of manufacturing industrial valves for the free world

POWELL CORROSION RESISTANT VALVES

THE WM. POWELL COMPANY CINCINNATI 22, OHIO

How you can help your company cut costs, improve profits

Switch from rigid containers to Bemis laminated-textile bags—the toughest shipping sacks made. They're more economical. They cut shipping and storage costs. And they give you worry-free service.

CUT INITIAL PACKAGE COSTS

Bemis laminated-textile bags can often replace drums or expensive double packages. One chemical manufacturer who changed from fiber drums to Bemis bags saved 48¢ per hundredweight.

CUT SHIPPING COSTS

Bemis laminated-textile bags are lighter in weight than rigid containers, can be palletized for space-saving in shipment. The bags are easier to handle, too.

CUT STORAGE COSTS

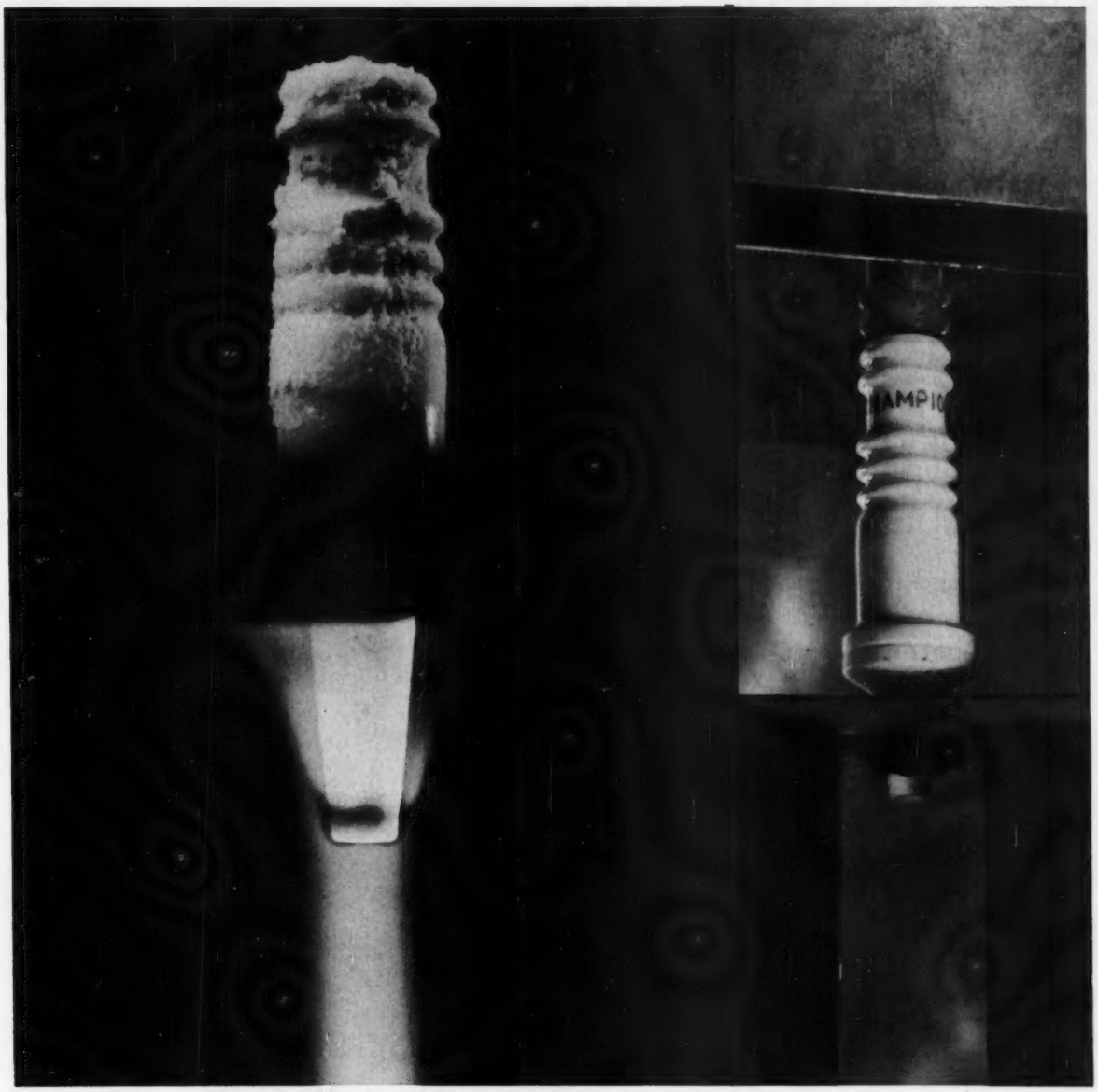
Bemis bags save storage space when filled because they stack compactly. They save even more space when empty. One thousand baled bags occupy about the space required for only 23 drums.

RECEIVE WORRY-FREE SERVICE

Bemis laminated-textile bags protect against moisture gain or loss . . . keep odors in or out . . . protect against contamination, insect infestation . . . and protect against sifting.

Bemis General Offices: 408-J Pine Street, St. Louis 2, Mo. CH 1-0900

where packaging ideas are born



Insulators with terrific resistance to thermal and mechanical shock! This spark plug insulator was cooled to minus 100°F. One end was suddenly brought to a white heat while the other end remained covered with frost. Another insulator was forced to pierce a ¼-in. steel plate—and remained undamaged.

From a frosty minus 100°F to white heat in seconds! . . . because ceramic engineers at Champion *mixed imagination with Alcoa Aluminas*

These Champion Spark Plug Company tests are more severe than any spark plug service requirements. But what better way to prove the almost unbelievable thermal and mechanical shock resistance of high-alumina ceramics?

Ceramics today do things undreamed of until Alcoa® Aluminas made them possible. Alumina refractories withstand inferno heats, yet remain strong and stable under load. Ceramic parts composed principally of Alcoa Aluminas meet many of the toughest demands of high-powered, high-frequency electronic equipment. Alumina ceramic cutting tools outperform tools of other materials. Mechanical ceramics, textile ceramics, even missile nose cones—all are better than ever because they're made with Alcoa Aluminas.

Why don't *you* mix imagination with Alcoa Aluminas to make your old product better or a new product possible? Send for our booklet, *Ceramics—Unlimited Horizons.* Aluminum Company of America, 706-L Alcoa Building, Pittsburgh 19, Pa.

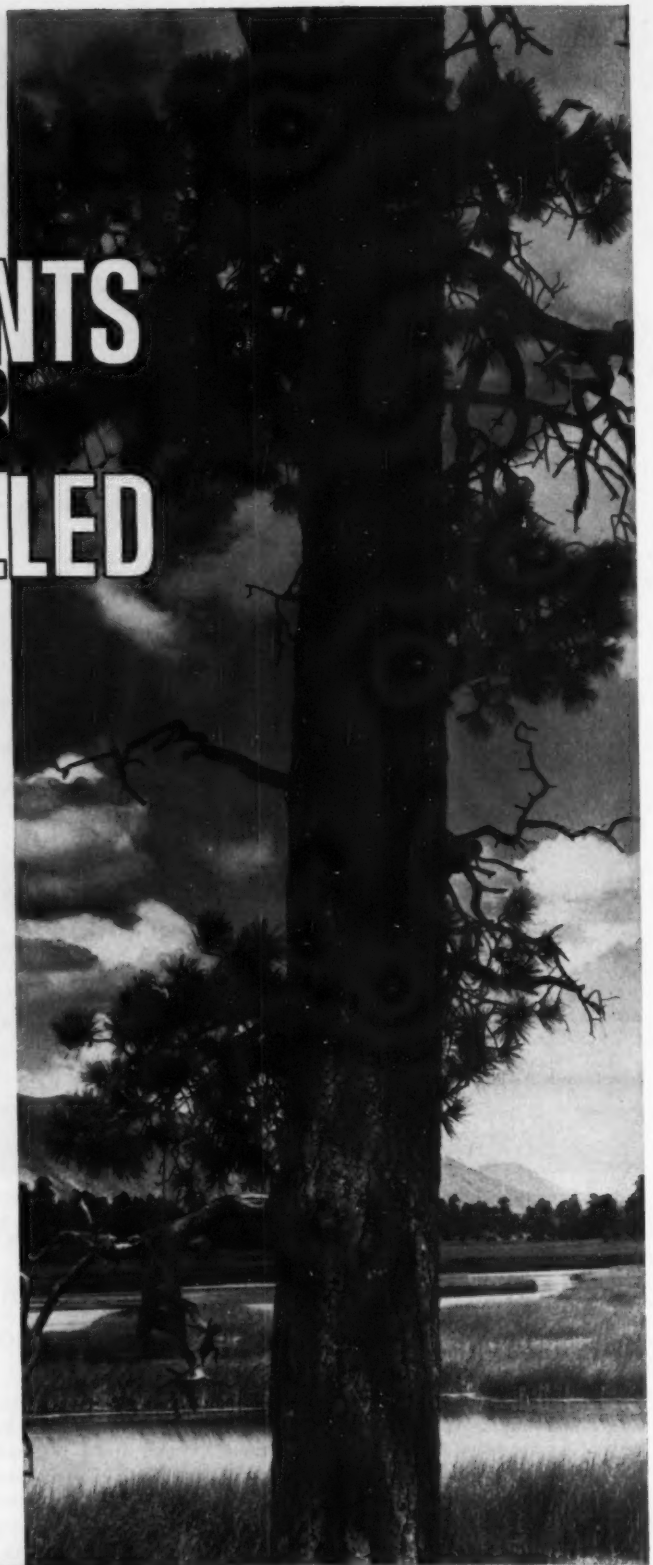
Entertainment at its Best . . . **ALCOA PREMIERE** with Fred Astaire as Host . . . Tuesday Evenings, **ABC-TV**

ALCOA CHEMICALS

ALUMINUM COMPANY OF AMERICA

"... But only God can make a tree."
—*Joyce Kilmer*

SOME ACHIEVEMENTS HAVE NEVER BEEN EQUALLED



Eventually man may find a substitute for pine trees. However, the day seems far off. As far off, in fact, as the day when a better product than Pine Oil will be discovered . . . as an ingredient for the soap and detergent industry . . . and as an all-around blending ingredient where high solvency performance is required.

Pine Oil's exceptional wetting properties, bactericidal properties, and safety make it one of the most important raw materials used in the manufacture of liquid detergents, soaps, laundry aids, general cleaners, disinfectants and deodorants. There are two good reasons for this . . . *Pine Oil smells clean . . . Pine Oil cleans clean.*

Look to Hercules for all the Pine Oil you need, because when everything is considered, Pine Oil still remains an outstanding ingredient for many diversified uses. Technical data is available by writing to Hercules.

P061-1

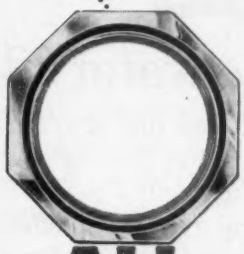
Pine & Paper Chemicals Department

HERCULES POWDER COMPANY
INCORPORATED

Hercules Tower, 910 Market Street, Wilmington 99, Delaware

The Pine Tree—Some 90 species of pines are found in the U. S., two of which are among the most valuable trees to be found in all North America. These are the Longleaf Pine and its cousin, the Slash Pine. They grow principally in our Southlands and furnish rosin, turpentine, pine oil and other important basic products.

YOU NEED TRI-SURE® PROTECTION



ALL

THE

WAY

Every drum that bears your company name carries more than your product. Pride, reputation, prestige and customer good will are riding along, too. That's why you should insist on Tri-Sure Drum Closures *all the way* — Tri-Sure Flange, Tri-Sure Plug, and Tri-Sure Cap-Seal. Tri-Sure is your insurance that the contents are perfectly safe from leakage, contamination, tampering and substitution. The recipient knows, when he sees a Tri-Sure Closure, that the contents are free from impurities and in the quantity specified. Remember this — unless you have *all* genuine Tri-Sure components you stand to lose everything you hoped to gain by specifying Tri-Sure in the first place. Insist on Tri-Sure.

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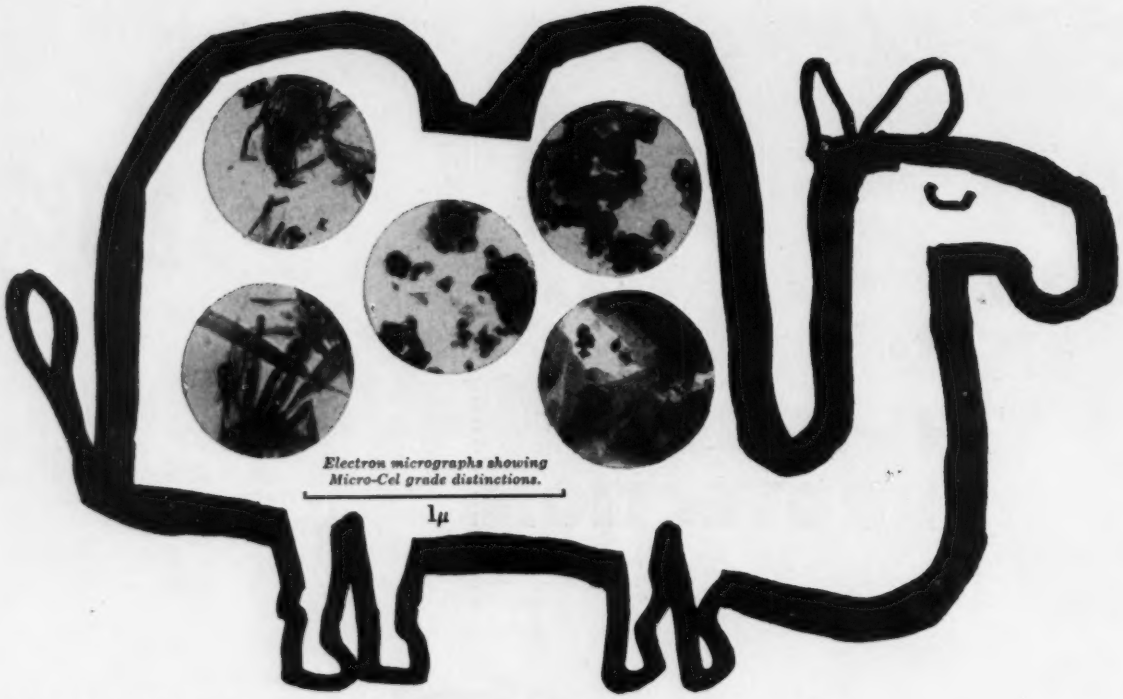

Micro-Cel holds water like a camel!

Micro-Cel®, Johns-Manville's new line of synthetic calcium silicates, absorbs up to 6 times its weight in water . . . remains a free-flowing powder after absorbing triple its weight in liquid. 4½ lbs. bulk to a full cu. ft. Costs only 7 to 8¢ a lb. (F.O.B.). Surface areas up to 175 sq. m/gr. Micro-Cel, available in several grades and offering a wide range of physical properties, may provide the cost-cutting answer to your formulating problems. For further information, samples and assistance, mail in coupon!

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☐ Please send free sample of suitable grade of Micro-Cel for use in:_____

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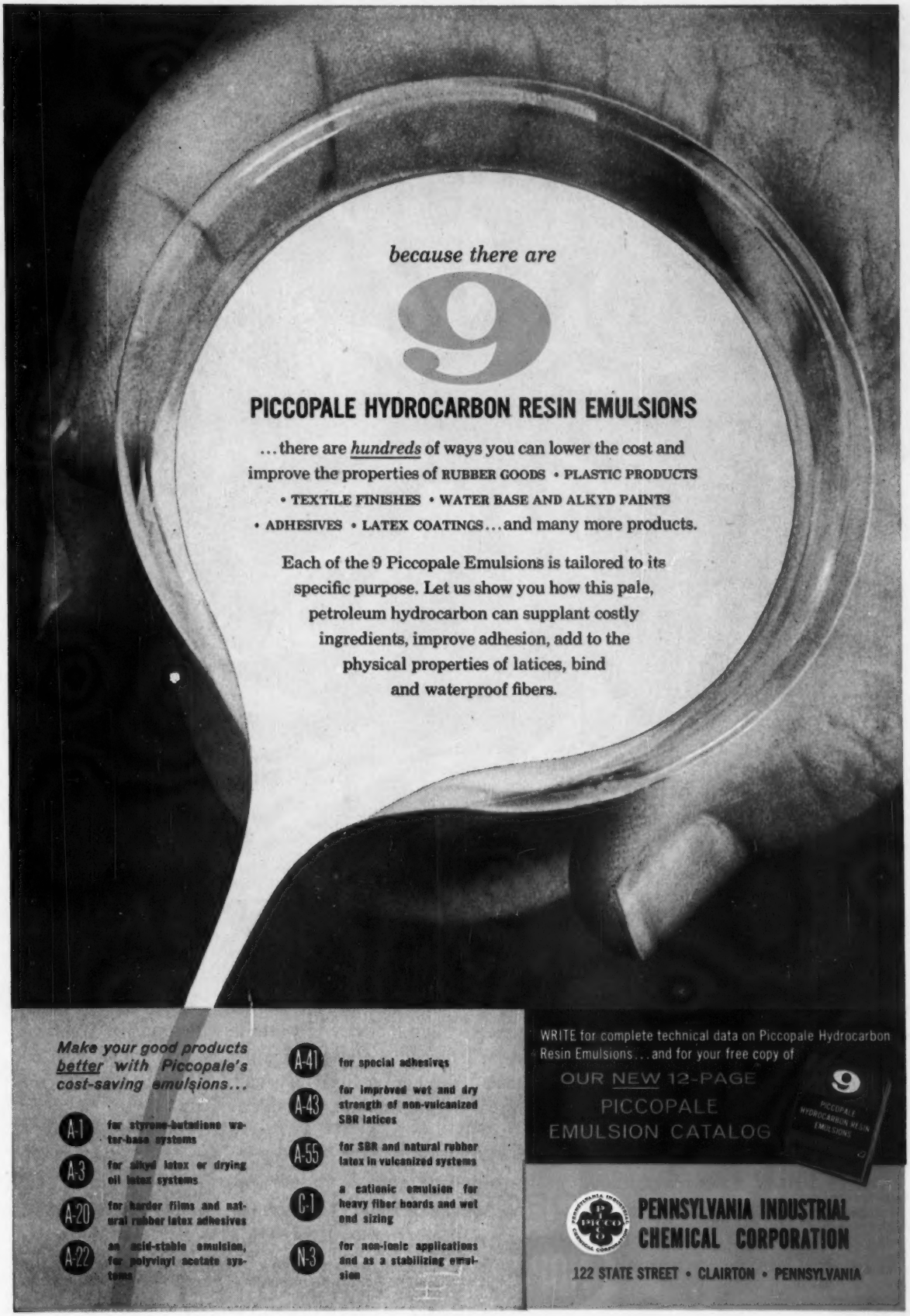

because there are

9

PICCOPALE HYDROCARBON RESIN EMULSIONS

...there are *hundreds* of ways you can lower the cost and improve the properties of RUBBER GOODS • PLASTIC PRODUCTS • TEXTILE FINISHES • WATER BASE AND ALKYD PAINTS • ADHESIVES • LATEX COATINGS...and many more products.

Each of the 9 Piccopale Emulsions is tailored to its specific purpose. Let us show you how this pale, petroleum hydrocarbon can supplant costly ingredients, improve adhesion, add to the physical properties of latices, bind and waterproof fibers.

Make your good products better with Piccopale's cost-saving emulsions...

- A-1 — for styrene-butadiene water-base systems
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- A-43 — for improved wet and dry strength of non-vulcanized SBR latices
- A-55 — for SBR and natural rubber latex in vulcanized systems
- C-1 — a cationic emulsion for heavy fiber boards and wet end sizing
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WRITE for complete technical data on Piccopale Hydrocarbon Resin Emulsions... and for your free copy of

OUR NEW 12-PAGE PICCOPALE EMULSION CATALOG

PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION

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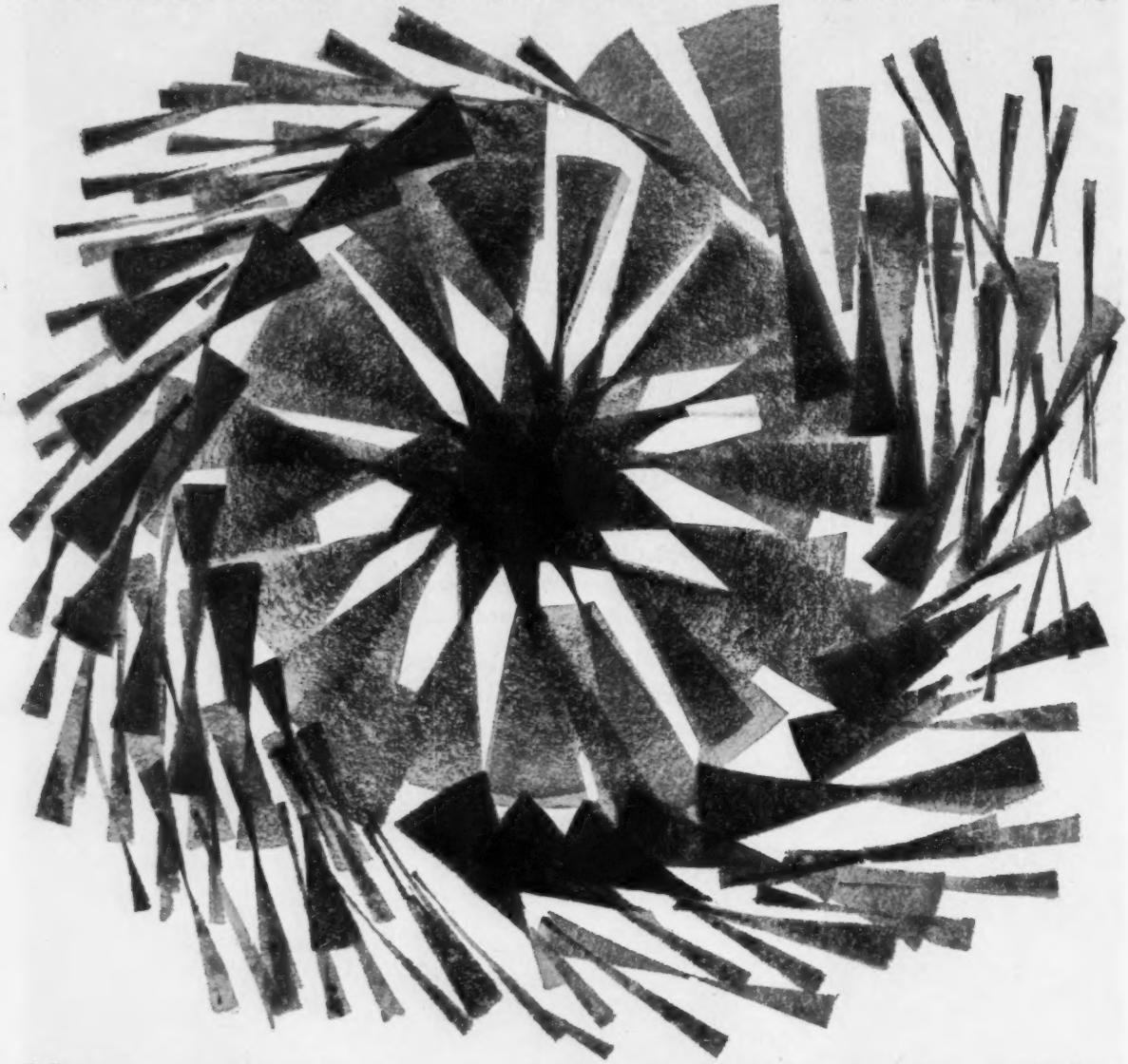

Nopco makes water more serviceable

Millions of dollars in research and over 50 years' experience have made us chief water chemist to a dozen different industries. By way of example, Nopco surfactants help household and industrial cleaners get behind the grease. Nopco defoamers help roll out reams of spotless paper at high production rates. Nopco emulsions impart bond strength and specific adhesion to latex products and lubricity to water in wire drawing. Whatever your operation, if water is basic to it, you can count on Nopco ingenuity to change its characteristics to suit you.

For further details, see Chemical Materials Catalog

Lubricants
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Plasticizers
Softeners
Emulsifiers
Dispersants
Wetting Agents
Defoamers
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NOPCO CHEMICAL COMPANY

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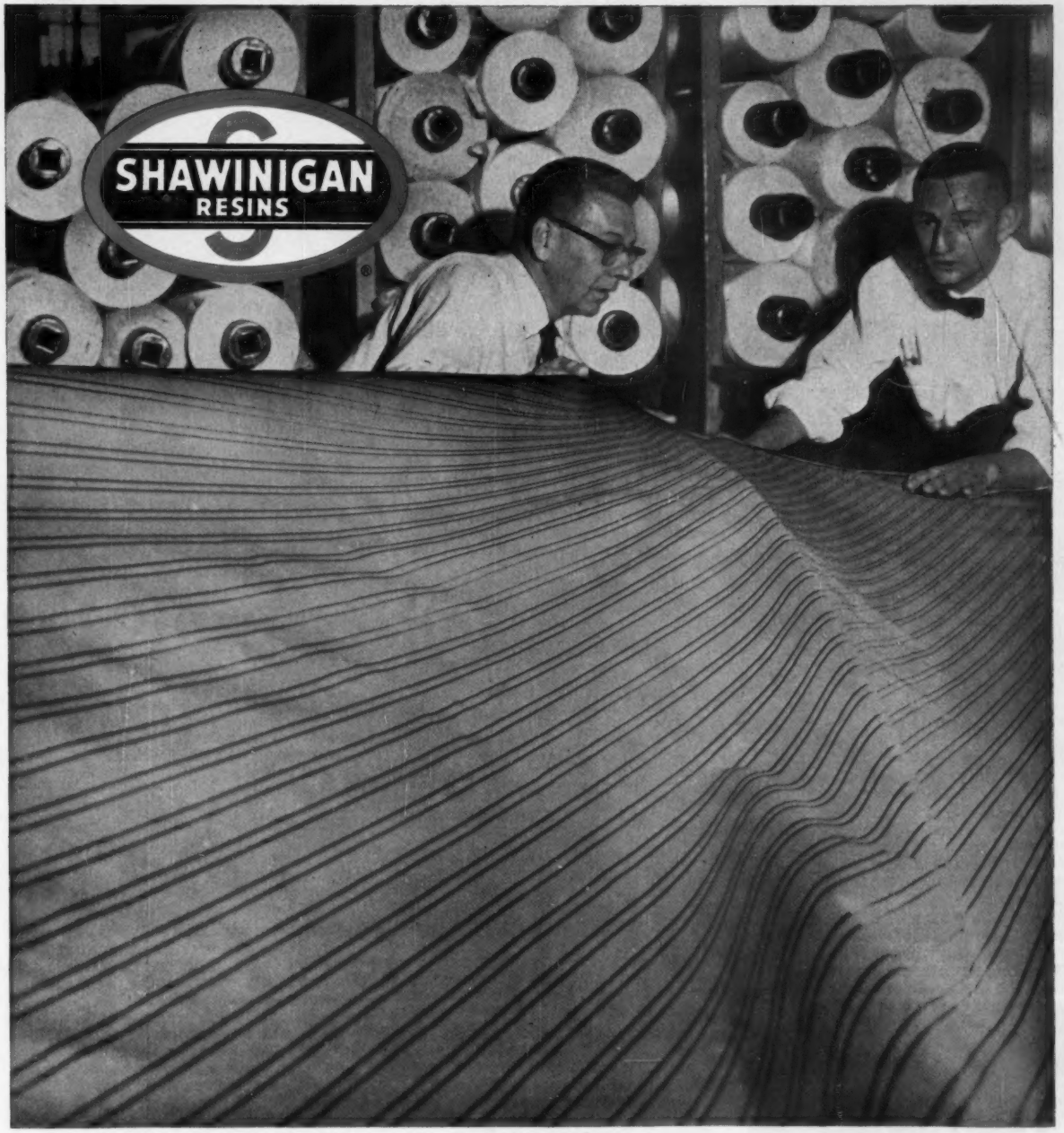
Manufacturing Licensees Throughout the World



SIZEABLE REQUIREMENT *Needed:* low cost, high quality sizings for natural and synthetic fibers and fabrics . . . to improve weaving efficiency and enhance finished product appearance. *Answer:* easy-to-apply sizing formulations based on GELVATOL® polyvinyl alcohol—developed by Shawinigan's creative research. As specialists in polymer chemistry, we are solving problems and improving products in such varied fields as textiles, paper, pharmaceuticals, adhesives, building products, electronics. The answer to your sizing, coating or bonding problem is probably in our more than 60 resins, emulsions and solutions. Or we'll custom-develop it. For literature, write Dept. 13.

Shawinigan Resins Corporation, Springfield 1, Massachusetts.

ONE OF A SERIES OF CHATS ABOUT THE CONSERVATION AND CONTROL OF HEAT

SARCO TOPICS

DOWNTIME DOWN —OUTPUT UP

Continuous processing . . . two big words in the world of chemicals . . . and one big headache when the processing has to stop unexpectedly. It's not just the pure pain in the neck that mechanical failure produces. It's the production costs that keep mounting during down-time.

Let's face it, no one can eliminate every bug. But steam trap failure is a bug there's no excuse for. Not since Sarco created the Thermo-Dynamic Steam Trap, Type TD-50.

For example, Reichhold Chemicals know how bugless it is. They have standardized on this unique steam trap in their new Maleic Anhydride plant at Elizabeth, New Jersey. Of their 320 TD-50's, most are in service on 35-lb. steam tracer lines.

Results? Results!

For one thing, Reichhold has learned that TD-50's hardly know the meaning of the word downtime. Then, too, maintenance people like them for their ease of inspection and service. And TD-50's don't require high quality steam to function.

The character pretending to inspect one of Reichhold's TD-50's is Sarco's ad manager, who normally wears a gray flannel suit. We're happy to see strainers used properly on this 14-trap manifold to protect the steam traps, even if they don't happen to be Sarco strainers.

We don't want to sound like an advertisement, but it's this way: the TD-50 is so simply designed it has only one moving part; its performance is uniform; it operates equally well on heavy, light, or no condensate load — even against back pressures up to 50% of inlet pressures; it's so rugged that superheat, water hammer, vibration, or corrosive condensate won't affect it; if you should ever want to service a TD-50, a highly unlikely prospect, you can unscrew the cap, clean it, blow it down, and have it back on stream in 40 seconds.

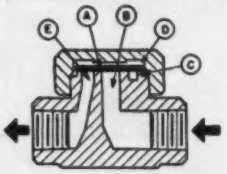
MR. BERNOULLI HELPS BUILD A BETTER STEAM TRAP

We may be a trifle tardy in bringing it up, but Daniel Bernoulli, who dreamed up the "Bernoulli Effect" about 250 years ago, deserves some sort of accolade from us here at Sarco. A plaque perhaps, or his name in the foyer floor tile. Daniel was a famous Swiss mathematical genius and he was probably a little hesitant about even mentioning his slightly offbeat discovery, the "Effect," in *Hydrodynamica* (1738).

If you happen to have a spool handy, you can perform the simple "effect" right at your desk. Lay a cardboard disc with a pin through it on the table. Place the spool over the pin and blow—hard—and lift. The disc won't fall until you stop blowing because the air under pressure expands between the end of the spool and the disc. The pressure in this space is actually less than atmospheric, and the sum of the downward forces is less than the upward force of atmospheric pressure acting upon the disc's bottom side.

Well, of course it *sounds* rather remote, but what seemed like a simple parlor trick to Bernoulli has made it possible for us at Sarco to solve steam trapping problems by the dozens. In our Sarco Thermo-Dynamic Steam Trap, Type TD-50, the cardboard disc is replaced by a stainless steel disc A, the spool tube by inlet tube B. The disc also acts as a valve and can seat on B, and also on outer seat ring C. When seated, the disc seals the inlet and the chamber D from the outlet E.

Full attention now, because it could easily be *your* steam, condensate, or air we're following here as it enters the trap, its pressure raising the disc and allowing fluid to flow radially across the underside of the disc. The velocity of air or condensate is comparatively low, exerting little influence on the disc, which remains



clear of the seat, allowing free discharge. Ah, but now steam enters the trap. Velocity increases greatly because of the steam's greater internal energy. Presto! The disc is pulled toward the seat just as was the cardboard. At the same time, the radial steam jet raises the pressure in D by recompression, snapping the disc down on the seat.

Downward force of recompressed steam in D, acting on the full area of the disc, is greater than the upward force of the inlet steam acting on the smaller area of the inlet orifice. So the disc remains seated, stopping all flow of steam, until pressure in D is reduced by condensation, and the cycle is repeated.

BEYOND THE TD-50 PRINCIPLE

Surprise! In spite of the one-track subject matter you've had the decency to ingest so far, we manufacture a good deal more than TD-50's. As a matter of proud fact, we are the only company that makes and sells all five types of steam traps. After all, there is a place for Balanced Pressure Thermostatic, Float Thermostatic, Camlift Bucket, and Liquid Expansion Thermostatic Steam Traps too. And our knowledgeable engineers can tell you exactly where to use what—and how.

And may we modestly add, that's only the beginning? As long as our present conversation seems to consist of product name dropping, we'll just mention the fact that we make exceptionally fine pressure and temperature regulators of rather astonishing variety and ingenuity. For example, we have a complete line of self-powered regulators for heating and cooling. And to make most effective use of these last few lines—strainers of all kinds—even hand and motor operated scraper strainer types. We could fill this page with lists of applications, testimonials, and specifications, but it would be eminently more sensible simply to say: Tell us your problem.

Write us direct, or contact your local Sarco sales representative or sales office.

Pardon our monopolizing the conversation in this series of paid communiques, but we're trying our best to interest you in certain subjects that concern us both—to the point where you'll communicate. 5902

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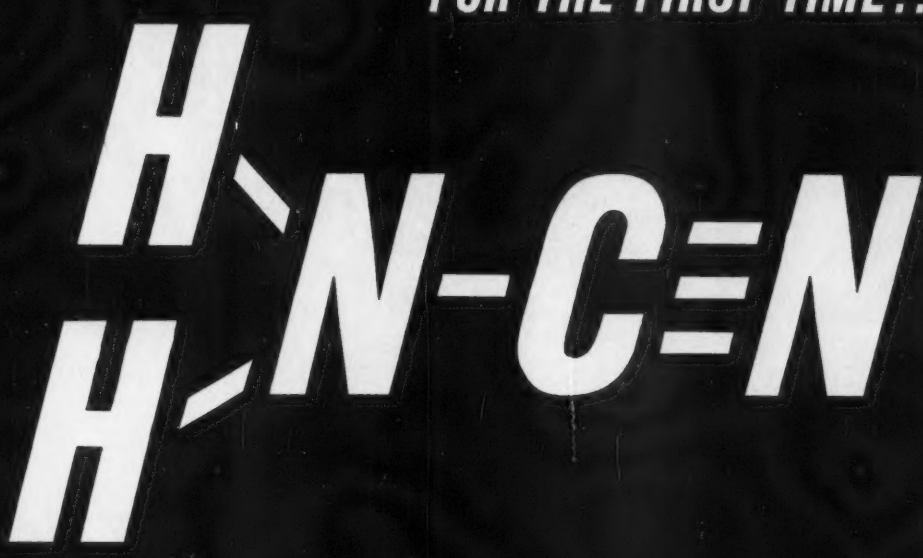

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This new form of an old and useful compound contains a minimum of metallic and nitrogenous contaminants. For full details, send for your free copy of our data sheet on Hydrogen Cyanamide and/or the comprehensive technical manual, "Cyanamide by Cyanamid," and a sample.

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Products Marketed Under the AERO® Trademark are:
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AMERICAN CYANAMID COMPANY
PROCESS CHEMICALS DEPARTMENT • 30 Rockefeller Plaza, New York 20, N. Y.

American Cyanamid Company CWP-114
Process Chemicals Department
30 Rockefeller Plaza, N. Y. 20, N. Y.

Please send me:
☐ "HYDROGEN CYANAMIDE" Data Sheet
☐ "CYANAMIDE BY CYANAMID" Technical Manual
☐ A sample of Hydrogen Cyanamide

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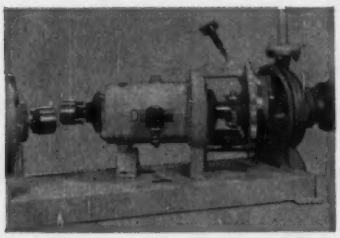
For complete details on the type that suits the products you now make or plan to make in the future, consult our Technical Service Department. Titanium Pigment Corporation, 111 Broadway, New York 6, New York; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments, Ltd., Montreal.

8497-B

TITANIUM PIGMENT CORPORATION
SUBSIDIARY OF NATIONAL LEAD COMPANY

Booths 520-532
at the Chem Show

Some fundamentals of centrifugal pump design for the chemical process industries



The primary pump problems in the chemical industry involve materials of construction, gland and seal leakage, and bearing failure. Unless pumps are specifically designed for chemical service, unless materials of construction are selected to handle specific corrosive conditions, unless maintenance is simple and parts standardization is high your pumps may be the biggest headache in your entire operation.

Materials of construction

DURCO has spent 50 years developing alloys and materials for practically any corrosive service.

Pumps and pump parts are available in fourteen standard and many special corrosion resistant alloys. All of these are cast in the Durco foundry to retain complete responsibility for the excellence of your equipment.

Chlorimet 2	Ductile iron
Chlorimet 3	18-8-S (304 s.s.)
Durco D-10	18-8-S-Mo
Durichlor	(316 s.s.)
Duriron	Monel
Durimet 20	Nickel
Durcon (modified epoxy resin)	Ni-Resist #2
	Inconel

Specific design for Chemical Service

Shaft run-out and deflection have been the major causes of seal deterioration, gland leakage and bearing failure in pump operation. DURCOPUMPS have shafts with diameters substantially larger than those traditionally used in centrifugal pumps. Shafts have a maximum run-out of .0015" with centerline deflection of no more than .005" at the impeller under maximum hydraulic load. Bearing housings are a thru-bore design, assuring perfect alignment. With this minimum deflection, packing and mechanical seals last far longer under operating conditions.

Long bearing life

Reduced shaft deflection has made it possible to build Series H pumps for 3500 rpm operation. Heavy duty bearings are selected for a minimum life of two years at this speed under maximum operating stress. The normal life is many times greater than this. Bearings are sealed against oil leakage and external contamination by Durco designed Teflon* lip seals.

Many additional features designed into the Series H Durcopump give maximum flexibility in service. The casing is end suction, top center discharge and self venting with integral feet. Since it uses a rear cover closure, the pumping unit can be removed without disturbing the casing or disconnecting the process piping. *No drilled holes enter the casing at any point.*

Impellers are threaded into the pump shaft, eliminating the impeller nut, and thereby greatly reducing the required NPSH. Head and/or capacity for any pump may be changed merely by changing the impeller diameter. A horizontal seal ring permits adjustment of the impeller without increasing stuffing box pressures.

By the use of an adapter between the casing and bearing housing, eight pump sizes can be mounted on one bearing housing, utilizing one shaft. As a result, just four bearing housings will handle the complete range of Durcopumps. Since each is engineered for the maximum pump size in its range, most Durcopumps will have a built-in safety margin far beyond normal service requirements.

Simplified Maintenance

Simplified, low-cost maintenance results from maximum parts interchangeability and minimum down-time.

Bearing housings, shafts, and frame adapters on all Durcopumps are interchangeable over a wide range of pump sizes. A complete range of pumps can be maintained in your plant with a surprisingly small spare parts inventory.

The foot mounted reverse casing design was first applied to chemical pumps by Durco. This design holds process down-time and maintenance costs to a minimum. Pumps are designed for single trade maintenance. A millwright or mechanic can remove all rotating parts of a Durcopump from the casing in a matter of minutes. Neither the piping nor the motor need be disturbed. This means that rebuilt or new assemblies can be installed with little or no realignment.

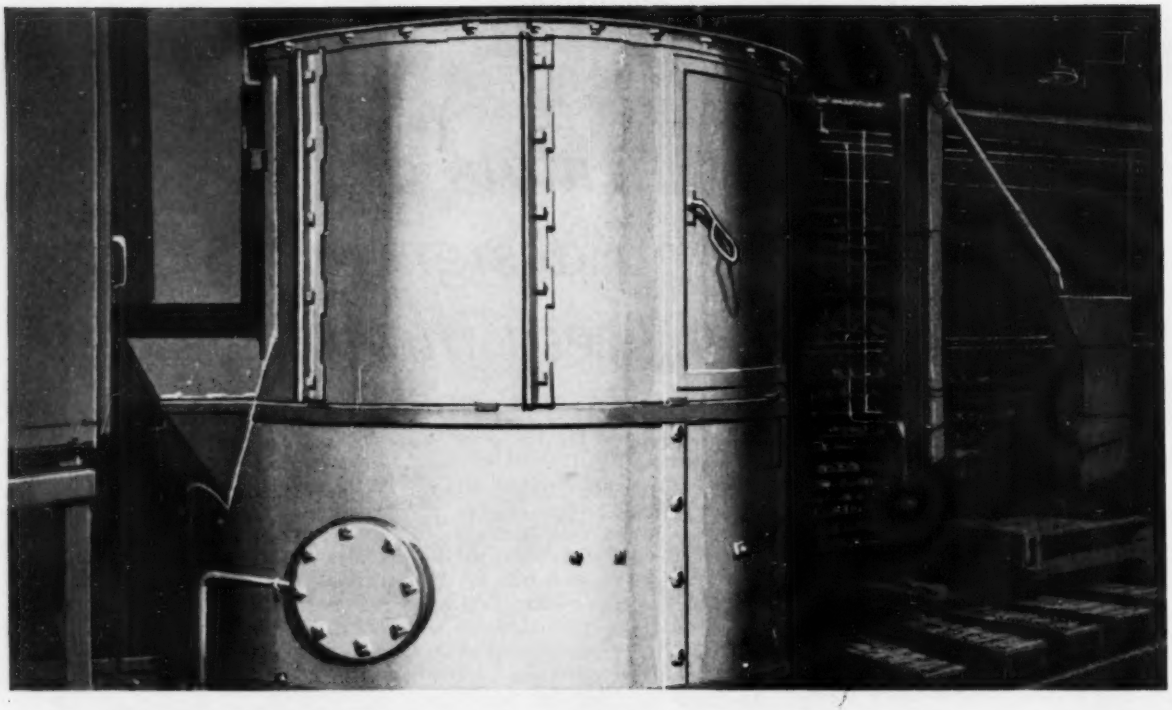
Durcopumps are available in sizes from 1" x 1" to 10" x 8" with capacities from ½ GPM to 4250 GPM, and heads to 345 feet. Durco also manufactures self-priming and submerged pumps for most corrosive services.

You will find that your local Durco Engineer is a reliable source of information on pumping problems and equipment.

**DuPont registered trademark*

THE DURIRON COMPANY INC., *Dayton, Ohio / Serves the process industries*

DURCO



Foundries Discover QO® Furfuryl Alcohol (FA®) as a Resin Modifier

New doors to progress in the foundry industry are being opened by the unusual properties stemming from furfuryl alcohol modified urea-formaldehyde resins. These resins offer many new approaches and economic advantages in the production of dimensionally accurate cores, used in casting a variety of metals.

Here are some of the outstanding features of the furfuryl alcohol modified resin that have made possible the development of the high speed "hot core box" process:

1 Hot strength increases as the FA content increases, making possible the formulation of binders used in casting metals from aluminum to steel.

2 Gas evolution—both rate of evolution and total gas evolved decrease as FA content increases.

3 High solvency allows use of high solids UF resins with low viscosity. This eases the distribution of the binder, assuring strong uniform cores and enables cores to be cured rapidly.

4 Resists overcure—permitting cores to be cured over a wide range of conditions.

These properties combine to give a family of binders for the production of strong, accurate cores at a fraction of the time required with other binders. These are the properties that improve production efficiency to make more profitable end products.

For specific information, write to the Quaker Oats offices listed below.

The Quaker Oats Company

CHEMICALS DIVISION

The Quaker Oats Company — CHEMICALS DIVISION — QO FURFURAL CHEMICALS ®

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Cleveland 14, Ohio

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New York 5, N. Y.

Room 436K, 49 S.E. Clay Street
Portland 14, Oregon

In the United Kingdom:
Imperial Chemical Industries, Ltd., London, England

In Europe:
Quaker Oats (France) S. A., 3, Rue Pillet-Will, Paris IX, France;
Imperial Chemical Industries (Holland) N.V., Rotterdam, Holland
Imperial Chemical Industries (Export) Ltd., Frankfurt a.M., Germany

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TRONA® BORON CHEMICALS MAKE YOUR GOOD PRODUCTS BETTER

TRONA boron chemicals are vital to the ultimate quality of the products you manufacture ...and TRONA boron technology, through advanced research and development, is creating new and versatile forms of boron for your products of the future. Knowledge of boron chemicals and their production in volume are special capabilities of American Potash & Chemical Corporation...a basic and expanding source of boron for industry and agriculture.

BORAX sodium tetraborate • V-BOR refined pentahydrate borax • TRONABOR agricultural pentahydrate borax • PYRO-BOR anhydrous borax • BORIC ACID orthoboric or boracic acid • SODIUM PENTABORATE • ELEMENTAL BORON • BORIC ACID ANHYDROUS boric oxide† • *plus these current developmental products:* Titanium Diboride • Rare Earth Borides • Boron Halides • Boron-Carbon Compounds • Boron-Phosphorous Compounds.

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You can also gain greater speed and far greater flexibility from a major advance in control computers.

MONEY ON

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COMPUTER

Stored Logic in the TRW-530 gives you economy in programming, economy in operating time, economy in memory requirements.

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How can Stored Logic work for you? Our engineers will tell you why Stored Logic in the TRW-530 is the money-saving answer to problems such as multiple-unit control in a large process plant. Contact one of our offices below.

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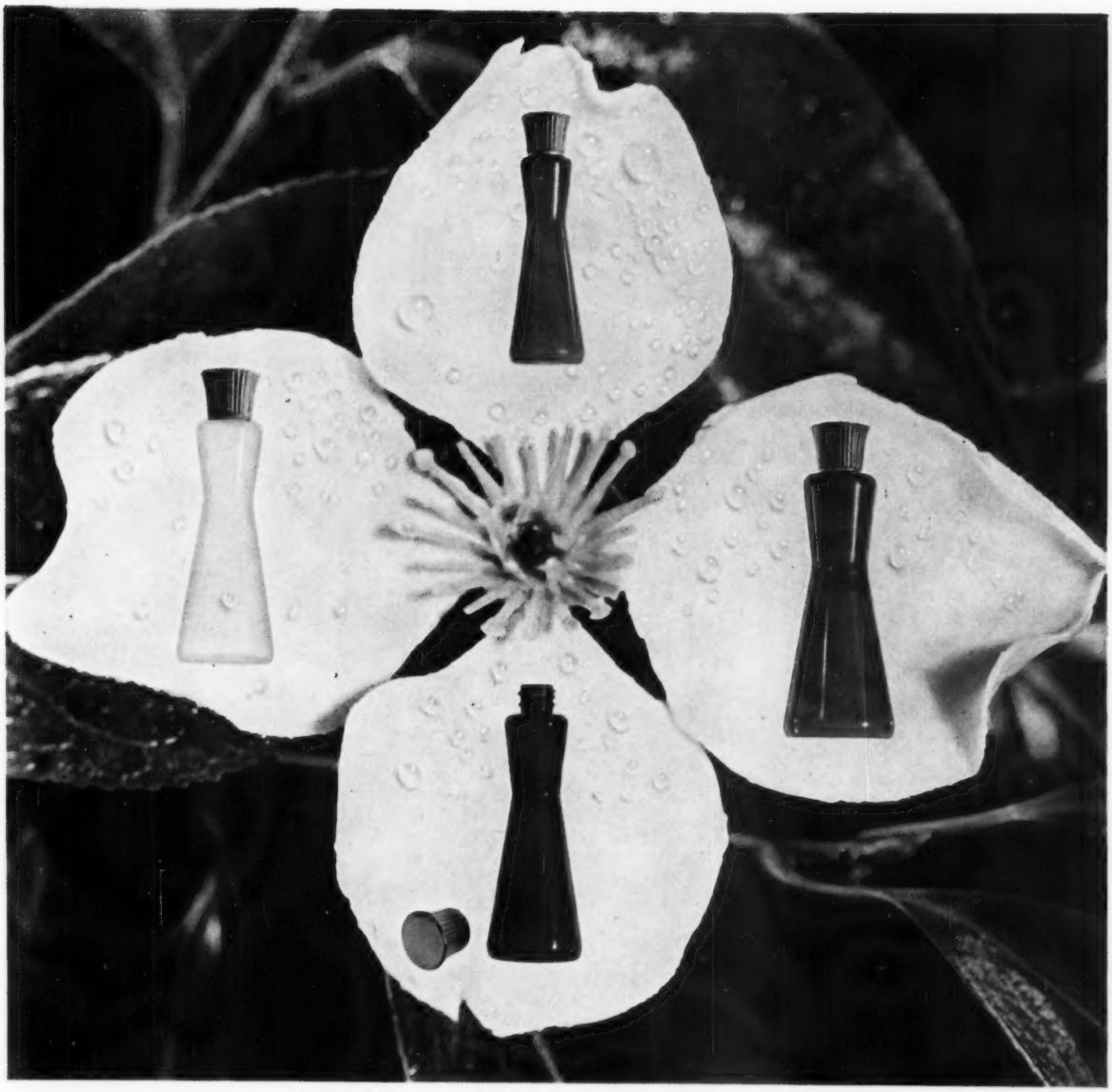

The New Vanity line from Owens-Illinois

Make these new glass bottles distinctively yours . . . with choice of surface color or treatment, closure and label

Whether you want to test a new toiletry or cosmetic product or be first to market with a new package, the "Vanity" line of Duraglas® bottles may be what you need. The possibilities for creating distinctive salespackages from this basic shape are almost unlimited.

You can have clear glass, the new "spray frost" surface treatment (a cool, near-white matte surface) or any other ceramic coloring you wish.

You can have molded plastic closures of whatever color you want, including gleaming metallized effects.

You can easily have your own decoration added in permanent, beautiful Applied Color Lettering.

Four sizes are currently available—2, 4, 6 and 8-ounce capacities.

Ask your Owens-Illinois salesman about the "Vanity" line.

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APPRECIABLE COST SAVINGS in their present electrolytic cell operations are being achieved by GLC anode customers through our past technical exchanges with them.

THIS GLC PROGRAM of technical progress is continuing so that still greater heights of anode performance will be reached in the future.

BY WORKING WITH YOU now, custom making anodes for your specific cell requirements, we can help bring greater economies to your chlor-alkali production in the years ahead.

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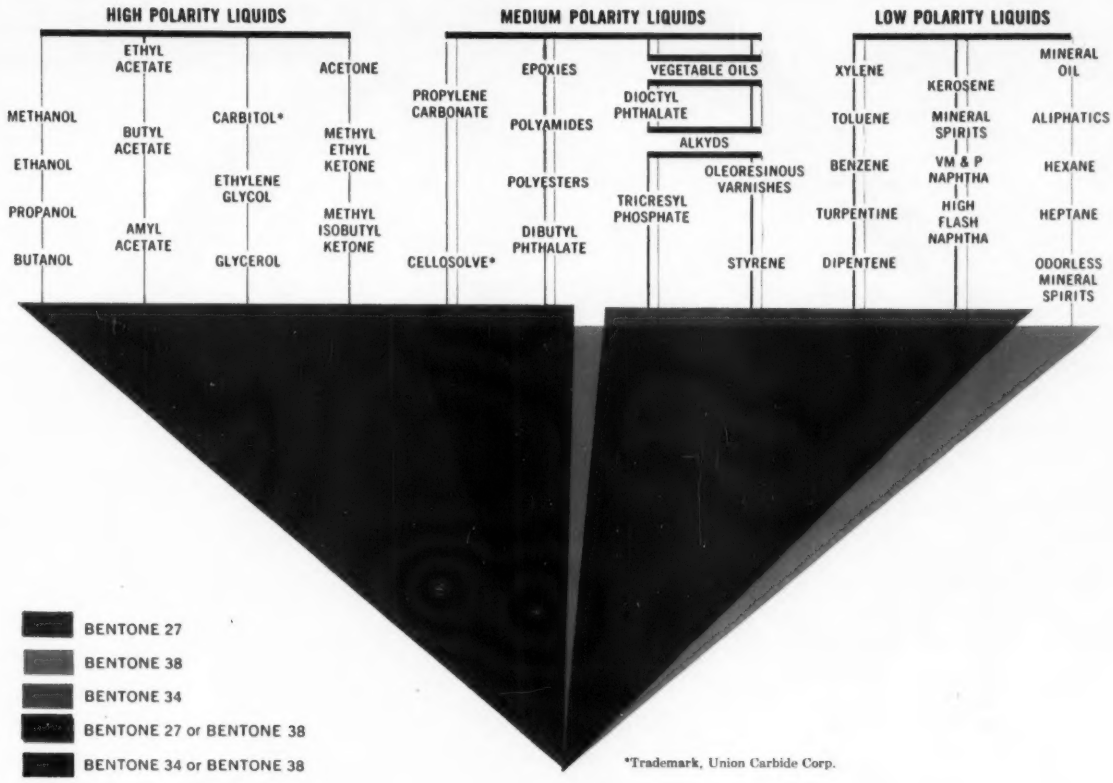


*Trademark, Union Carbide Corp.

How to select the best BENTONE® gellant for any organic system

Use this "Fan" to simplify the job... help you make the most efficient match!

Three BENTONE® gellants meet the specific needs of a wide variety of organic systems. In paints and coatings, the right BENTONE gellant provides effective control of viscosity and flow. It will keep solids in suspension—in plastic resins, in mastics and foams, in adhesives, printing inks and many other applications. And the proper BENTONE gellant does its job with remarkable economy.

Pinpoint your choice by using this selection "Fan" developed by National Lead Company. See how this color-coded device simply and conveniently matches each BENTONE gellant to its own area of solvent polarity. This helps minimize guesswork, simplify selection.

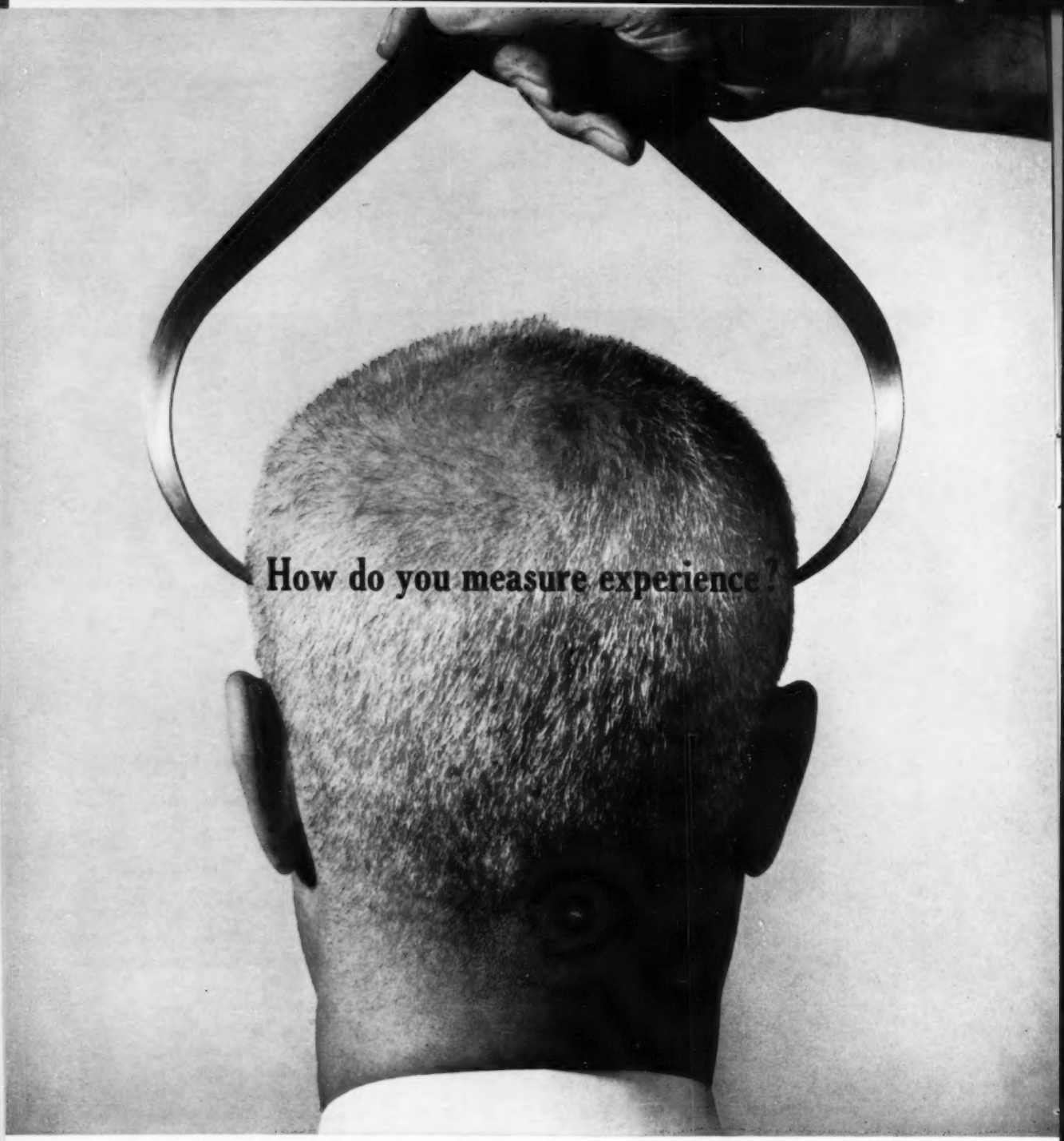
There's a large, easy-to-read "Fan"—in full color—on Page 8 of the Bentone Gellant Handbook. This valuable 55-page manual offers practical formulations and incorporation methods for paints, mastics, vinyl dispersions, epoxy and polyester resins, among others. It also offers helpful information on thixotropic gelling—much of it unavailable elsewhere. For a copy of the Bentone Gellant Handbook, simply write to National Lead Company. There's no obligation of any kind.

For a complete listing and description of these and other NLC products, see Pages 471 through 482 of the 1961 Chemical Materials Catalog

NLC

BENTONE® (Gellants) A Chemical Development of **National Lead Company**

General Offices: 111 Broadway, New York 6, N. Y.
In Canada: Canadian Titanium Pigments Limited, 1401 McGill College Ave., Montreal, Que.



Only one way, if you're sizing up an ammonia supplier—years in the business. And only Allied Chemical has 70 years of experience with ammonia. ■ In that 70 years we've probably solved any ammonia problem you may run into . . . acquired know-how which grows with every service call and is always on call . . . developed the facilities that make it possible to bring you ammonia as you want it, wherever and whenever you need it. It all adds up to customer savings in time and money. ■ Compare: Allied Chemical has five industry-located plants. Offers three forms—anhydrous, aqua ammonia and ammonium nitrate solutions. Ships to suit your needs: anhydrous ammonia in barges, tank cars, transport trucks and cylinders of 150, 100, and 50 lbs.; aqua ammonia in tank cars and tank trucks. Both are shipped from producing plants and bulk terminals nearest you. Evaluate all ammonia producers, then choose the one that measures up on all counts . . .

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Business
Newsletter

CHEMICAL WEEK
November 4, 1961

FTC's order to Union Carbide to shuck its Visking operation (*see p. 41*) has legal and trade observers harking back to the Supreme Court's decision in the Du Pont cellophane case (*CW, June 23, '56*).

Some feel that Du Pont's argument then (upheld by the high court)—that cellophane was interchangeable with other packaging materials and was only a part of the entire flexible packaging materials market—could well apply to polyethylene film now. This, of course, is at odds with FTC chairman Paul Rand Dixon's opinion that polyethylene film is a distinctive product, a "separate line of commerce."

Dixon notes that Visking, before its acquisition, was the largest film extruder in the U.S., but concedes that putting Carbide's $1.5-billion assets behind Visking's $38-million business would not necessarily mean a reduction of competition. Rather, he writes, it is the customer-buyer relationship between the companies that makes it important to prevent the possibility of monopoly.

Sole dissenter, FTC Commissioner William C. Kern, apparently bases his rejection of the commission's ruling on an argument similar to that which won the cellophane case—i.e., the market is not for polyethylene film *per se*, but for all flexible packaging materials.

Union Carbide, of course, won't say what its next move will be, but the Kern point might serve, in part, as a base for an appeal.

•

The French government this week slapped an "antidumping" tax on imports of polyethylene—and, for the first time, cited a single chemical company by name as a "dumper."

Spencer Chemical (Kansas City, Mo.) was tagged by the government, in apparent support of French chemical industry charges that "U.S. companies have been dumping polyethylene" (and ethylene glycol) on their markets.

Under terms of the decree, all imports of Spencer's standard quality high-pressure polyethylene in powder or pellets will be taxed 70 new francs/metric quintal ($14.14/220 lbs.) in the French customs territory.

Other European countries also have been decrying the "flood" of U.S. polyethylene. West German producers, for example, are complaining bitterly about it, charge that U.S. makers have been selling polyethylene in Germany at prices averaging 16½¢/lb. (with some lots as low as 10¢)—considerably under U.S. market prices (officially 27.5¢/lb.).

Fear is that such practices may spread throughout the plastics and synthetic fibers fields. Unlike France, Germany has no anti-dumping laws. It's likely that the French action may spark demands by German producers for similar aid from Bonn.

Just-revealed plans for a sorbitol plant by Howards & Sons, Ltd. (Cornwall, Ont.), may have stymied a similar project by Atlas Powder of Canada (Brantford, Ont.). The unit, to be Canada's first, will have a capacity of 8 million lbs./year, be in operation (at Cornwall) by Feb. '62.

Earlier this year, Atlas told the Canadian Tariff Board that it was pushing engineering work on a sorbitol plant. At the same time, the company pressed for duty-free entry of the material from the U.S., where the parent company has large production facilities. It's now likely that a sorbitol tariff barrier—15% (British Commonwealth preferred) and 20% (most favored nation)—will go up.

The Howards move puts Atlas in a quandary: Should it put up a second plant in Canada to meet captive needs (chiefly for production of surfactants) and general sales? Should it buy sorbitol (from Howards & Sons) or import despite higher tariffs? So far, Atlas officials haven't resolved the problem.

•

Two earlier reports are confirmed this week: One concerns Pittsburgh Plate Glass' Chemical Division's methyl chloroform plant at Lake Charles, La. (*CW Business Newsletter, Sept. 9*) the other, Stepan Chemical's phthalic anhydride plans in Puerto Rico (*CW Business Newsletter, Oct. 14*).

PPG's methyl chloroform unit, now under construction, will be in by late '62. No plant size is mentioned, but an earlier estimate pegs capacity at more than 15 million lbs./year. The company is also putting up a 30-million-lbs./year sodium chlorate plant at Lake Charles, site of a recently completed ethylene dichloride project.

•

Stepan's $7-million phthalic anhydride plant will be built on the south coast of Puerto Rico. Production is slated to get started in fourth-quarter '62. Not much of the output (estimated at 40 million lbs./year) will be captively consumed, says Stepan; most will be marketed, though not in competition with its customers.

Plant design and construction will be handled by Ralph M. Parsons Co. (Los Angeles), and the unit will utilize the German Von Heyden-Chemiebau process (*see CW Technology Newsletter, Aug. 12, for process details*).

Raw material naphthalene, as previously reported, will come from Commonwealth Oil Refining's projected $6.5-million plant near Ponce, P.R.

•

Monsanto is pulling together its petroleum and petrochemicals operations; the new group will be known as the Hydrocarbons Division. The setup will include Monsanto's new sprawling Chocolate Bayou complex under construction near Alvin, Tex., the company's Texas City plant, and its Lion Oil Co.

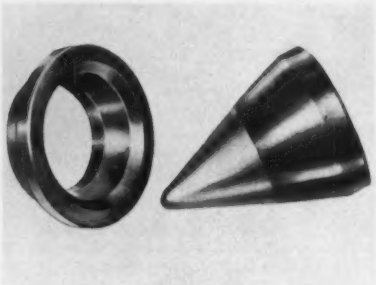
U.S.I. CHEMICAL NEWS

November A Series of Advertisements for the Chemical Process Industries 1961

Hard Carbides Answer Need For More Rugged Materials In Chemical Processing

The hard carbides, particularly those of tungsten and titanium, are becoming more firmly established as materials for critical components in chemical processing equipment. Increased application is expected because these carbides have properties that cannot be equalled by other structural materials.

These hard carbides have high wear



Valve components of hard carbides had 20 times service life of second best material in regulating pressure drop of 900F gases carrying aluminum oxide catalyst.

and corrosion resistance, excellent rigidity, high strength, and high-temperature properties. Thus they reduce maintenance, increase operating efficiency and even make new processes possible by permitting higher combinations of temperature, pressure, flow rate or volume.

Chemical Applications

Among current chemical industry applications for hard carbides are nozzles for such equipment as centrifuge separators, drying towers, emulsifiers; valves for reci-

(Continued on next page)

UDMH Data Published

Comprehensive data on unsymmetrical dimethylhydrazine (UDMH) have been compiled in a two-page article appearing in a recent issue of *Chemical Engineering Progress.*

The paper, written by Louis H. Diamond of FMC Corporation, covers physical properties, manufacturing processes, purification methods, storage and handling, materials of construction that can be used with UDMH, and its propellent applications. FMC Corporation is a partner with U.S.I. in a new plant to produce UDMH in multi-million pound quantities.

For a reprint of the paper, write Technical Literature Dept., U.S.I. Chemical News, 99 Park Ave., New York 16, N. Y.

Stabilization, Valve Developments Broaden Aerosol Markets

Propellant Additive Stabilizes Alcohol-Based Products; New Valve System Opens Way for Aerosol-Dispensed Anti-Perspirants

Recent advances in aerosol technology reportedly eliminate problems in pressure-packaging two important classes of products: alcohol-based formulations and anti-perspirants. Nitromethane has been found to be effective in stabilizing alcohol-containing aerosols against metal container corrosion. And a new non-metallic valve and closure has been designed which minimizes clogging caused by drying out of aluminum salts used in most anti-perspirant and deodorant formulas.

Both developments are seen as broadening the market for aerosols. Up to now, for example, the corrosive action of personal product formulas containing alcohol with propellant 11 has generally precluded packaging in aluminum containers. Aerosols have not made any dent in the anti-perspirant field, which represents an estimated market in excess of 93 million packages with a retail sales value of over $95 million.

Free Radical Inhibition

The development of an effective stabilizing agent for alcohol-based aerosols resulted from extensive research. An early premise was that hydrolysis was the cause of corrosion. But tests revealed that the distortion of odor, development of acidity and, ultimately, corrosion of the container were due to a free radical reaction of trichlorofluoromethane, or propellant 11, with ethanol. This has been substantiated

(Continued on next page)

New Composite Polyethylene Container Saves Money For Chemical Company

Polyethylene drums with wirebound overwraps have reduced initial container costs 60 per cent and lowered overall packaging, handling and shipping costs for a major chemical distributor.

Where possible, the company switched from 13-gallon glass carboy cases to relatively inexpensive composite containers for chemicals. The new packages consisted of 15-gallon polyethylene drums in octagonal protective wirebound overwraps.

In addition to savings on initial container costs, the new containers increased pallet capacity by over 125 per cent in gallonage and doubled it in number of containers. They also reduced storage area requirements since pallets could be high-stacked. This was made possible by designing the overwrap so that the protruding neck of the polyethylene drum is just below the level of the end cleats. And shipping container tare weight was cut from a previous 70 pounds to 15.5 pounds, with comparable savings in shipping charges.

Photo courtesy E. I. du Pont de Nemours & Co. Inc.

Corrosion control by nitromethane shown by two aerosol cans subjected to same tests. Can at left contained alcohol/propellant 11; at right, alcohol/propellant 11 plus nitromethane.

National Distillers, Cerro Join in Primary Aluminum Feasibility Study

Cerro Corporation and Bridgeport Brass Company Division of National Distillers and Chemical Corp. have announced a joint study of the feasibility of an aluminum reduction plant of 56,000 tons annual capacity at Wauna, Oregon.

Though a decision whether to undertake the project will be made on completion of the study and on a satisfactory arrangement for financing, a 20-year contract for 90,000 kw of electrical power already has been signed by Cerro.

The proposed plant will employ the conventional aluminum electrolytic reduction process and use prebaked carbon electrodes produced at the site. U.S.I.'s extensive background in the technology of metals reduction will make important contributions to the study.

Hard Carbides (Continued)

procating pumps and use in pressure-relief, pressure-regulating, flow-regulating or other service; seats, stem rods and impact rings of homogenizers; seals and rings; pump bodies and components; liners for steel cylinders for compressed petroleum gases.

Powder-Metallurgy Materials

Hard carbides are powder-metallurgy products, made of the carbides of refractory metal elements, combined with a lower melting-point matrix material. Most common of these is tungsten carbide, cemented with varying amounts of cobalt. Composition is varied by adding the carbides of titanium, tantulum, niobium and chromium. These modify properties to meet particular operating conditions.

Six basic types are available for process-industry components:

- Straight tungsten carbide-cobalt, with properties named above.
- Tungsten carbide-cobalt with TiC, TaC, NbC to improve gall resistance or high-temperature properties.
- Titanium-base carbides with nickel or nickel-molybdenum binders for light weight, resistance to high-temperature oxidation, greater strength at 1800F and above, and high stiffness-to-weight ratio.
- Tungsten carbide with chromium-cobalt binders for combinations of moderate corrosion and wear.
- Tungsten carbide with platinum binder for extremely corrosive conditions involving some wear.
- Binderless carbides of tungsten and tantulum for the ultimate in wear and corrosion, but limited strength and impact resistance.

Aerosol Developments *(Continued)*

in U.S.I.'s research laboratories. The reaction:

$$CCl_3F + CH_3CH_2OH \longrightarrow CHCl_2F + CH_3CHO + HCl$$

Although it was established that air can retard the degradation process, this attack on the problem had drawbacks. Further investigations proved that nitromethane, added as a 0.3% solution in propellant 11, filled all the requirements. Such a stabilized propellant mixture, now commercially available, is believed to be compatible with most non-pharmaceutical aerosol products now on the market.

Use of the new stabilized propellant formulation appears especially advantageous for such aerosols as hair sprays and other personal products, room deodorants, and plant sprays. Government approval will be required before pharmaceutical products utilizing it can be sold.

Details of Valve System

The new, non-clogging valve system features a self-sealing cap, which acts as a "cork" for the aerosol package between uses—thereby minimizing crystallization of the aluminum salts.

Outside, the cap looks like any other. The clue to its effectiveness is inside. It's tapered to seal against the sides of the toggle-type actuator, and it has a projection which fits snugly into the spray orifice. In addition, ribs along the inner sides snap onto the valve cup. Both actuator and closure are made of low-density polyethylene.

The valve, also non-metallic, is said to produce an unusually fine spray and reduce the "chill" associated with aerosols. The system is expected to be used with adhesives, as well as anti-perspirants.

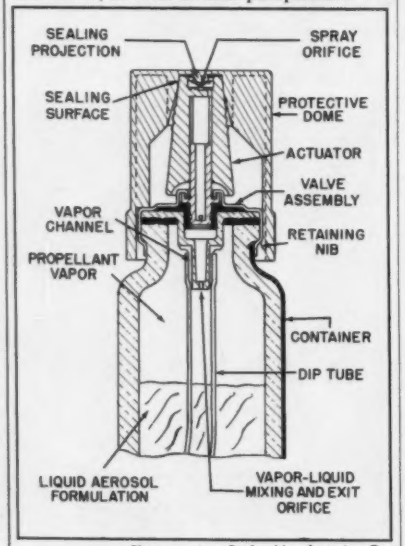


Photo courtesy Risdon Manufacturing Co.

New aerosol valve and closure developed for packaging anti-perspirants.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Two new anionic surface-active agents, alpha-sulfopalmitic and alpha-sulfostearic acids, are available in pilot plant quantities. Among applications are detergents (including bars), greases, flotation agents. **No. 1770**

Three new synthetic rubber developments have recently been described: ethylenepropylene rubber, a promising tire material; *trans*-1, 4-polyisoprene, a synthetic balata; and an improved method for making vinyl pyridine compounds. **No. 1771**

New preparative gas chromatograph lets chemist prepare ultra-pure organics without lengthy analytical distillations or separate samples of up to 10 ml and recover separated components for further study. **No. 1772**

Translation of chemical names into molecular formulas has been accomplished by electronic computer, using a newly constructed grammar of chemical nomenclature. Seen as aid to classifying, indexing, teaching nomenclature. **No. 1773**

Adjustable-flow polyethylene bottle for hydrofluoric acid has patented closure which lets user "dial" the rate of flow—from a single drop to steadily controlled stream. One-pound container has slip-on dust cover. **No. 1774**

Two new groups of surfactants have been developed: high-molecular-weight heterocyclic nitrogen compounds (fatty imidazolines) and a water-soluble amphoteric series. Uses are in cosmetics, textiles, drugs, metals and petroleum. **No. 1775**

Vanadium trichloride (98+% pure) and vanadium tetrachloride (95+% pure) have been introduced in pilot plant quantities. Suggested uses include catalysts, organometallic intermediates, production of high-purity metals and intermetallics. **No. 1776**

Soviet research papers on electrolytes will be sold in a 110-page English translation. A collection of 21 papers covering electrochemistry of molten and solid electrolytes, the volume includes new data and methods. **No. 1777**

New metal plating compounds are applied by brush, spray or immersion without electric current. Said to give aluminum corrosion protection and decoration superior to anodic and conversion coatings. For wide range of metals. **No. 1778**

Non-separating benzoyl peroxide paste is now being offered in an improved formulation. Said to have these advantages as polymerization catalyst over standard formulations: fire resistance, even consistency, complete homogeneity. **No. 1779**

Please use number when writing.

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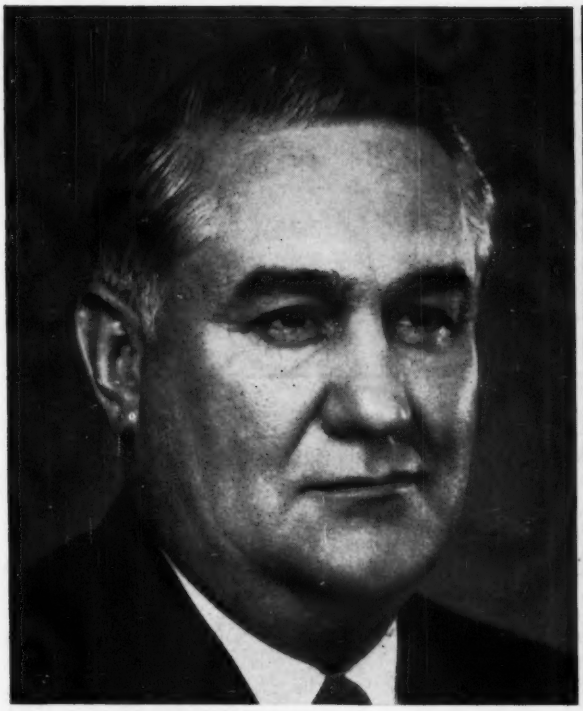


FTC Says Sell: Chairman Dixon rules that Carbide sell Visking's PE film business to prevent monoply.

Carbide Sits Tight: President Mason is figuring the odds on whether to let go or cling harder.

Taking Sides in PE Film Fracas

Union Carbide must sell the polyethylene film business of its Visking Co. division, the Federal Trade Commission ordered this week. But Carbide President Birny Mason, Jr., has not publicly accepted this decision; and none of the other integrated resin producers appears worried.

Three of Visking's polyethylene plants—at Fremont, Calif., Terre Haute, Ind., and Flemington, N.J.—were included in the order, which gives Carbide one year to complete disposal. However, Carbide has 60 days in which to decide whether to comply with the order or appeal it.

The order will not eliminate Carbide from polyethylene film competition, however. The company will keep not only Visking's synthetic sausage casing business, but a polyethylene plant recently built in Cartersville, Ga., as well. And Carbide has considered forming a polyethylene film extrusion division (*CW Business Newsletter, Oct. 28*).

The FTC first attacked Carbide's acquisition in 1957, only a few months after the Visking purchase, on the grounds that it violated Section 7 of the Clayton Act. That section forbids mergers that "may . . . substantially lessen competition, or . . . tend to create a monopoly."

Four Years Later: In the majority opinion, FTC Chairman Paul Rand Dixon charges: "We have more here than the mere amalgamation of the assets of two large and powerful corporations. We are here confronted with the merger of the dominant supplier of a raw material with the dominant processor and reseller of the same raw material. . . . The Union Carbide-Visking combine has the power to lower film prices below the break-even level of its small, non-integrated film extruder competitors and yet realize a profit on over-all operations."

In '59, Carbide's PE resin output was almost three times as large as that of its closest competitor (*table, p. 42*). During '60, the gap narrowed, with USI approximating half of Carbide's polyethylene production. From '56 to '59, Carbide's share of total resin shipments fell from 59.4% to 48.9%.

During the same period, Visking's purchases of polyethylene film resin rose from about 52 million lbs.—39.7% of domestic purchases—to about 84 million lbs. In '56, it shipped 46 million lbs., 40.2% of the total. The second-ranking extruder shipped 6.5%. In '60, it extruded close to 100 million lbs. of polyethylene film.

In contrast, Extrudo-Film Corp.—which, until its acquisition by Enjay Chemical last week, was the largest independent extruder—produced only

U.S. Polyethylene Resin Output—for All Purposes and for Film

Company	Total Domestic Shipments '56	'59	Film-Grade Shipments '56	'59	Share of Film-Grade Shipments '56	'59	Shipments to Captive Film Producers '56	'59
Union Carbide	188	303	77	153	59.4%	48.9%	—	72
Du Pont	83	110	26	20	20.1%	6.4%	0.04	4
U.S. Ind'l. Chem.	38	105	15	51	11.3%	16.3%	—	31
Spencer	33	44	2	14	1.6%	4.4%	—	—
Eastman	17	45	4	24	3.0%	7.7%	—	—
Dow	13	57	0.2	22	0.1%	7.3%	—	8
Monsanto	12	38	4	18	3.2%	5.8%	—	—
Koppers	9	27	2	10	1.3%	3.2%	1.6	9
Totals	**393**	**728**	**130**	**313**	**100%**	**100%**	**1.7**	**124**

20 million lbs. of film in '60. At this point, its profit margin was low enough so that it was willing to merge. Output of the still independent extruders probably totals at least 100 million lbs., but maximum individual output is no higher than 12-15 million lbs.

Where Will It Stop: Enjay's acquisition of Extrudo is the most recent in a chain of resin producer-film extruder mergers, which began in '55 with Koppers' purchase of Durethene Corp. Dow owns Dobeckmun, acquired in '57, and Extruders, Inc., acquired in '58; USI has Kordite, acquired in '58; and Du Pont has its own film division. This leaves only three of the five domestic polyethylene resin producers—Monsanto, Eastman, and Spencer—without extrusion facilities.

Resin producers find that buying an extruder is a fast way to get film-processing and consumer-marketing know-how. The extruder, in turn, usually finds it to his financial advantage to merge.

The industry is also aligning beyond the producer-extruder level. Spencer Chemical, which does not own an extruder but which has an agreement with Crown Zellerbach for purchase of its resin, bought three converters during the past summer. Two of these have been combined into a single subsidiary, Flexicraft-Wrapture, Inc. The industry is theorizing about the possibility of Spencer's purchasing an extruder outright, but Spencer insists that this is not part of its immediate plans.

Celanese and Rexall, which have agreements to purchase film-grade resin, but which do not yet make it, have also bought extruders. Celanese purchased Plastic Horizons—now part of Celanese Plastics—in '59; last year Rexall acquired Turex and Chippewa Plastics.

Carbide's Ally: Apparently sympathetic to nonmonopolistic mergers, FTC Commissioner William C. Kern disagrees with Dixon's opinion. He notes that Carbide's share of the polyethylene resin market has declined since the acquisitions; that competitors are healthy; and that Visking has increased resin purchases from other suppliers.

But even more important, he says, is that "the relevant market at the film level consists of flexible packaging materials and not just polyethylene film that is being sold for packaging purposes."

Kern's diagnosis of the health of the competition is offset by some industry opinion. Extrudo-Film President Albert Moss reports that his company needed additional funds—which could be acquired only through merger—to conduct the research and development necessary for survival. If the situation of a 20-million-lbs./-year producer is critical, one observer asks, how will the 5-million-lbs./-year company withstand competition from integrated extruders that produce more than two-thirds of the film in the U.S.? However, the small independents feel they are not in direct competition with Visking and will be unaffected by additional mergers or divestitures.

Fight for Markets: At the consumer packaging level, the market is dominated by polyethylene—250 million lbs., in '61—and cellophane—441 million lbs. in '60. Polypropylene film is just beginning to make itself felt, with an estimated 3-to-5-million-lbs. production during '61.

Arthur Ness, manager of the new products section of Du Pont's Film Dept., feels that polypropylene may well be a close third to polyethylene and cellophane within 10 years. USI Plastics Sales Manager Vincent McCarthy calculates that if polyethylene markets continue to grow at their current pace, about 600 million lbs./-year of PE will be used in flexible packaging by '71.

According to William Funk, Chemore's film division manager, polypropylene film will carve out its own markets, rather than compete for those held by other films. The exception: bread wrapping, where polyethylene and cellophane are now in a heated race. Funk estimates that production of cast polypropylene film will hit 58 million lbs. by '65, while that of oriented film—used for shrinkable packages—will reach 20 million lbs. The total may reach 100 million lbs.

Industrial applications of polyolefin films are relatively small. The first industrial film, Du Pont's Mylar, was introduced in '54. The field is young, which makes it difficult to estimate potential. Predictions are further complicated by the necessity for finding new, rather than replacement markets, for industrial films.

Polyvinyl chloride is the No. 1 film in industrial use. The next contender

is polyethylene, whose second largest film market—after consumer packaging—is in construction and agriculture. Currently, however, some 60-70% of the film-grade polyethylene produced goes into packaging. Cellophane's industrial use is limited to tapes and laminates, which barely make a dent in the consumer figures. Likewise, experts on polypropylene feel that its industrial applications will be gravy.

Squeeze Play: Whether or not Union Carbide decides to appeal the divestiture order, resin makers may think twice before seeking to acquire film converters. Converting is a specialized, custom operation, generally done on a local level. Resin producers find it difficult to adapt their national sales and management techniques to the converting business. On the plus side, the converter is the last step before the consumer—and consumer acceptance is all-important in film marketing.

In his majority opinion, FTC Chairman Dixon noted: "Mergers of this type [Union Carbide-Visking] beget additional mergers." The quickest way for a resin producer to acquire and maintain control in a competitive market—which is necessary if his rivals are slicing up market areas—is through acquisition. Resin producers say they have reached a point where it is virtually necessary to have a subsidiary as a captive market for film-grade resin. One point that many merged companies stress is that there are no contracts specifying the subsidiary's sole use of the parent company's resin. It is obvious, however, that a subsidiary extruder or film production department is a ready outlet for material.

The FTC decision is not likely to stem the tide of film-converter acquisitions, since none of the other resin companies seems to feel in a vulnerable legal position. Industry expects the trend toward integration will continue, until there may be eight vertically integrated corporations, each with facilities for polymerizing ethylene, extruding the resin, and cutting and printing film.

Polypropylene seems to be following the same trends. The norm seems to be for establishing a film division, as Chemore and AviSun have done, or buying up an extruder, as Enjay has done.

New Clash in Old Suit

Chances for a speedy ending of the 12-year-old antitrust suit against Du Pont and General Motors virtually vanished last week.

It appeared last month that the government and Du Pont were edging close to an agreement that would give Du Pont considerable freedom as to methods to be used in disposing of its 63 million shares of GM stock (*CW, Oct. 14, p. 31*). But last week, in a hearing before Judge Walter J. LaBuy in U.S. District Court at Chicago, four lawyers took steps that appeared to add up to much more disputation in the case.

Leaving a Door Ajar: Paul A. Owens, speaking for the Justice Dept.'s Antitrust Division, moved to amend the proposed final judgment submitted by the government last month. The new—and tougher—version would make it clear that "the only adjudication in the final judgment is the finding of a violation of Section 7 of the Clayton Act." This would mean that the government then would be free to make a new effort, at any future time, to try Du Pont and GM on Sherman Act charges.

Owens' reasoning is along these lines: In 1954, Judge LaBuy threw out all of the government's original charges under both the Clayton and Sherman acts. Then in '57, the U.S. Supreme Court handed down an "unqualified" reversal of LaBuy's decision, and also ruled that Du Pont's ownership of about 23% of GM common stock violated the Clayton Act. Both in that '57 decree and in its '61 dictum that Du Pont must dispose of its GM holding, the Supreme Court said nothing about the Sherman Act charges.

If Judge La Buy accepts this line of reasoning—over Du Pont's opposition—it could strengthen the hand of a group of GM stockholders who were represented in the Chicago court last week by Maynard I. Wishner.

Asking an Accounting: Wishner asked that his clients—who contend that Du Pont illegally used its influence as a big GM stockholder in selling paints and fabrics to the auto company—be allowed to intervene in the government's case against Du Pont and GM. Wishner's clients already have a private antitrust suit pending against Du Pont and GM in New York; they're seeking a court order for Du Pont to make an accounting of profits realized on sales to GM.

Du Pont's proposal for a final judgment in the Chicago case is so worded that—if adopted by LaBuy—it could probably be used as a defense against that New York lawsuit. The government's newly proposed version, however, would be much more favorable to those individual litigants, in that their claim is based on the Sherman Act.

Fighting a Forced Sale: A third new area of contention in the Chicago case was brought out by attorney Wilkie Bushby, representing Christiana Securities, a holding company that owns nearly 30% of Du Pont's outstanding common stock. Bushby took exception to a clause in the government's proposal for a final judgment that would require Christiana to sell all the GM shares it might receive in any distribution of such shares to Du Pont's stockholders.

Nothing in the proceedings up to now, he maintained, gives the government any right to make such a demand. Forced sale would damage some tax-exempt Christiana stockholders, he told the court.

Still another move that could further prolong the case: Cox asked LaBuy to extend the deadline for a final decree so as to see whether Congress will pass a stockholder relief bill in the session beginning next January. He and Cox maintained that enactment of one of the tax-sparing bills now pending in Congress would call for a new kind of divestiture order.

Justice Dept.'s Owens: He asks the court not to tie government's hands.

Guessing at Geismar

Gulf Coast industry men were speculating this week about Union Oil Co.'s reasons for buying a 488-acre tract of land at Geismar, La., valued at more than $500,000.

Although Union's manager of operations K. C. Vaughan says UOC has no immediate plans for the site, conjecture focuses on two facts: (1) Geismar has already proven to be a good spot for petrochemical plants, and (2) Union's 80%-owned subsidiary Collier Carbon and Chemical (Los Angeles) is on the lookout for good petrochemical locations (*CW, May 20, p. 23*).

Union has previously shown how bullish it is about the whole area between Baton Rouge and New Orleans. It is co-owner with Goliad Corp. (Houston) of a $13-million natural gas processing system in Louisiana (*CW, Dec. 10, '60, p. 17*). The system includes a 450-million-cu.ft./-day natural-gas liquids extractor facility at Cow Island, Vermilion Parish, La. and an 86-mile pipeline connecting it to a 10,000-bbls./day hydrocarbon fractionating plant at Geismar.

Other petrochemical companies that have recognized the potential of the Geismar area include: Monochem Inc., which is building a plant with a yearly output of 80 million lbs. of acetylene and 150 million lbs. of vinyl chloride (*CW, June 24, p. 43*); Wyandotte Chemical Corp., ethylene and ethylene glycol; and Borden Chemical and U.S. Rubber, each of which is planning units to produce more than a dozen petrochemicals including polyvinyl chloride and urethane foams.

Vaccine Verdict

Sabin live-virus oral polio vaccine is winning support in Great Britain as well as in the U.S.

Last week in London, British Health Minister Enoch Powell told Parliament the British government has approved the Sabin vaccine for routine vaccination of persons in priority groups (taking in most persons up to 40 years of age).

The government, he explained, has accepted the recommendations of its joint committee on poliomyelitis vaccine, which said the Sabin vaccine could be used safely and effectively for primary vaccinations. But the committee added that pending further study, the Sabin vaccine should not be used to complete a vaccination course started with Salk killed-virus vaccine.

So long as Salk vaccine is available, however, it should also be provided for primary vaccinations if the doctor prefers it, the committee recommended.

The approved Sabin vaccine is called trivalent, in that it is devised for immunization against all three types of polio virus. It is to be administered in three doses at four-week intervals.

Up to now, the U.S. Public Health Service has licensed only Type I and Type II Sabin vaccine for commercial manufacture. Several months ago, Pfizer received the first PHS license to produce a live vaccine against Type I polio (*CW Washington Newsletter, Aug. 26*); and in October Pfizer got the first PHS license to produce Type II vaccine. Pfizer has applied for a license on Type III vaccine in the U.S.; and a decision on this application is expected by year-end.

Two weeks ago, Britain's Public Health Laboratory Service reported a conclusion that the Sabin vaccine is preferable to the Salk vaccine to ensure immunity of a community as well as of an individual.

Eyeing German Textiles

Two events point up **DuPont's** increasing interest in Europe's—particularly Germany's—textile market. Du Pont de Nemours International S.A. (Geneva) will form a new, wholly owned subsidiary company, called Du Pont Chemie GmbH., to sell synthetic fibers in Germany. And Du Pont de Nemours (Nederland) N.V. will soon begin production of Orlon acrylic fiber at a new plant in Dordrecht, the Netherlands.

The new German company, with main offices in Dusseldorf, will handle sales of Orlon, Nylon, Lycra and other synthetic fibers made by Du Pont. It will provide technical assistance, merchandising and promotional services to German textile customers. Formerly, these duties were handled by the Ernst Beck organization of Wuppertal-Barmen, Du Pont's sales representative since 1954. The new organization will take over at about the end of this year and employ most of Ernst Beck's personnel. Ernst Beck will be a member of the board of directors of Chemie and Charles D. Wenrich, marketing manager at Du Pont's New York Textile Fiber Dept., will be managing director.

"We believe that the establishment of a Du Pont sales subsidiary will meet the growing needs of the very important German textile industry and will help broaden the market for our fibers in Germany," stated Thomas Milligan, managing director of Du Pont de Nemours International.

Du Pont President Crawford Greenewalt recently pointed out that Du Pont's '60 foreign sales were more than the company's total '40 sales.

On Mufflers by '64

Muffler-type smog-control devices will not make their appearance on new autos any earlier than the 1964 model year, officials of two companies researching the problem told the New York Society of Security Analysts last week.

Harlan B. Foulke, vice-president of Arvin Industries (Columbus, Ind.), and F. Emerson Ivey, Jr., technical service manager of W. R. Grace & Co.'s Davison Chemical Division (Baltimore), agreed that it will take at least one more year to meet the standards established by the California Motor Vehicle Pollution Control Board. By then, plans will be nearly complete for the '63 cars. Both feel closer cooperation between smog-control device researchers and car manufacturers will be needed.

Test Change: California has altered one of its testing requirements to produce more reliable data. Applicants must present results of tests on three to five cars operated for at least 12,-000 miles each. Cars must be selected to represent high, medium and low emitters, and be operated under a variety of driving conditions. Previously applications had been received with data from just one or two cars operated continuously for two or three shifts per day.

One immediate result: Oxy-Catalyst Inc. (Berwyn, Pa.)—only manufacturer to have a catalytic smog device accepted for Step 1 testing—has withdrawn its application pending further testing to meet the new requirements.

Lining Up Lime Firms

Two acquisitions involving lime and limestone producers were completed last week. Pfizer carried out its acquisition of New England Lime Co. (Adams, Mass.) by issuing approximately 313,000 shares of common stock — current market value about $13.8 million—for all of New England Lime's assets, business and good will. Negotiations had been under way since early last spring (CW Business Newsletter, April 29).

This transaction included the stock of Nelco Metals (Canaan, Conn.), a New England Lime subsidiary that produces high-purity metallic calcium and magnesium in addition to various limestone products.

Pfizer Chairman John E. McKeen said plans are under way for substantially increasing capacity of both of the newly acquired plants. In addition, he said, "Pfizer's technical facilities, marketing resources, and scientific research will be put to work in exploring new applications and expanded markets for New England Lime products." He noted that some lime and limestone products are used in fields already served by Pfizer, "and the possibility of marketing certain of these products on a nationwide scale through Pfizer's chemical and agricultural divisions is under active consideration."

C. C. Loomis and William J. Ash—who served as chairman and president, respectively, of New England Lime—will continue in charge of the new Pfizer division.

Gibsonburg Lime Products Co. (Gibsonburg, O.) has acquired the building and industrial lime business and tradenames of Woodville Lime and Chemical Co. (Toledo). Gibsonburg Lime will now produce and sell lime under all Woodville tradenames in addition to its own brands. Woodville's sales organization will be retained by Gibsonburg and will be operated as Gibsonburg's Blubag Division. Woodville will continue to produce chemical, metallurgical and roadstone lime materials, and to manufacture and distribute fertilizer products.

Earlier this year, Diamond Alkali acquired Bessemer Limestone and Cement Co. (Youngstown, O.) and reorganized it as Diamond's Bessemer Cement Co. division (*CW, Sept. 16, p. 30*).

IMC's Ware: Expanding in phosphates, nitrogen and potash.

Growing Four Ways

International Minerals & Chemical Corp. (Chicago) last week embarked on a four-way expansion program in keeping with its new, one-word corporate motto, "Grow."

In Idaho, IMC is linking with Husky Oil Co. (Cody, Wyo.) in a joint venture to develop phosphate reserves estimated at 50 million tons. Those reserves—owned by Husky—are located near Soda Springs, some 45 miles east of Pocatello, and are said to be "one of the largest known reserves of surface-mineable phosphate ore in the U.S."

Farther east—exact location not yet determined—IMC is getting ready to build a nitrogen fixation plant. As company President Thomas M. Ware put it to stockholders attending the annual meeting in New York's Biltmore Hotel last week: "We are basic—I repeat basic—in phosphate and potash, and we plan to be basic in nitrogen in the very near future." Later, asked whether the proposed nitrogen plant would be built in Florida (where IMC is about to start up a diammonium phosphate plant), Ware replied: "No, it will probably be north and west of Florida."

Ware also told his stockholders, "We are interested in foreign phosphate deposits and have an interesting possibility overseas for immediate consideration." One industry source suggested that this might involve production and processing of phosphates —possibly in the Mediterranean area —to be shipped to India, where IMC and two partner companies hold a license to put up a $51-million fertilizer plant at Vizagapatam *(CW Business Newsletter, March 4)*.

Finally, Ware said that IMC's $40-million potash project in Saskatchewan is now proceeding at such a rate that "we expect to have the mine in production by early summer." This project had been delayed more than a year, but the shaft sinking is now down to 2,020 ft., Ware reported, and is expected to reach the potash level (3,000-ft. depth) early in '62. Capacity is scheduled to reach 1.2 million tons-year by early '63.

In addition, IMC is completing a $4-million expansion and modernization job at its Florida phosphate works, and is introducing four new phosphate fertilizer products.

With first-quarter (ended Sept. 30) sales up 15%, to $27.5 million, Ware foresees a similar gain for this fiscal year as a whole, bringing 12-month volume to perhaps $150 million by June 30. First-quarter net earnings were $801,954, in contrast to a net loss of $601,491 in the July-August-September quarter of last year. But he cautioned that full-year earnings probably would not match that gain.

The IMC-Husky agreement allows up to five years for development of a final plan for the joint venture. If Husky should decide not to participate, the agreement provides "an equitable basis for sale of the deposits to IMC."

While IMC is increasing its investments in phosphate operations in Florida and Idaho, it recently sold its undeveloped industrial-grade phosphate reserves in Tennessee to Hooker Chemical (*CW Business Newsletter, July 15*).

Stockholders elected two new directors: Earl L. Butz, dean, School of Agriculture, Purdue University (Lafayette, Ind.); and Robert W. Purcell, New York lawyer. Purcell is also chairman of International Basic Economy Corp. (New York), consulting firm specializing in international investments. Butz served as Assistant Secretary of Agriculture from '54 to '57. They succeed as IMC directors Jervis J. Babb, New York consultant and former chairman of Lever Bros., who resigned; and Rawleigh Warner, chairman of Pure Oil Co. (Chicago), who did not stand for reelection because he had reached the company's age limit for directors.

Claiming a New Name

General Aniline & Film Corp.—whose new chairman wants to change the name to Ansco Corp.—last week staked out a claim on that name by filing articles of incorporation in Delaware.

So far, the new Ansco Corp. is purely a paper organization. Its charter lists capital stock of 250 shares, no par value, and the purpose of the new corporation is "to deal in chemicals." GAF's board of directors met in the company's New York headquarters last week, but took no action on the name change advocated by Chairman John I. Snyder, Jr. (*CW, Oct. 14, p. 32*).

Meanwhile, this proposed move is being studied by Interhandel, the Swiss company that claims ownership of about 95% of GAF's outstanding stock. John J. Wilson, Washington attorney who represents Interhandel, told *CW* that he might oppose the name change if it appears that GAF would be losing a valuable name or trademark.

In recent years, Interhandel has blocked several attempts on the part of GAF management to issue new stock (*CW Business Newsletter, Dec. 26, '59*). Interhandel's 13-year-old-suit to gain custody of the disputed stock —which was seized by the U.S. government during World War II under the Alien Property Act—is still in pretrial stage.

Probing a Plant Blast

A five-man "blue-ribbon" coroner's jury last week visited the site of the Helene Curtis Industries' blast (*CW, Oct. 28, p. 23*) in Chicago to probe the causes of the explosion. The jury included Abbott Laboratories' superintendent for chemical manufacturing, William Behrens, Abbott's safety engineer for chemicals, John Verlenden; also a Chicago architect and two officials from the Chicago pipefitters and plumbers union.

This much is known: the four mixing tanks and their steam jackets and the sulfonation building boiler impounded by Chief City Boiler Inspector James McKeague were found intact. One of the theories formerly held was that an overheated reaction in one of these tanks might have been the explosion's cause.

ICWU's Mitchell: Asking AFL-CIO assistance in planning union mergers.

New Plea for Pairing

In the AFL-CIO's third biennial convention, starting Dec. 7 in Miami Beach, the International Chemical Workers Union will ask for a continuing program of interunion coordination leading to mergers.

ICWU President Walter Mitchell—convinced that a four-way merger of the Chemical Workers, Rubber Workers, Textile Workers, and Oil, Chemical & Atomic Workers is necessary and "inevitable" (*CW, Oct. 7, p. 30*) —is spearheading the move. Last week, meeting at union headquarters in Akron, O., ICWU's executive board approved a resolution that Mitchell wants to introduce in the AFL-CIO convention at Miami Beach.

This resolution calls for the AFL-CIO to set up a "Dept. on Interunion Cooperation and Merger." That new agency's work would include:

- Linking the efforts of unions with common interests.
- Forming interunion councils to coordinate bargaining strategy among unions whose locals hold contracts with the same employer.
- Lining up joint organizing campaigns in key industrial sectors.
- Mediating any disputes between AFL-CIO unions.
- Providing guidance and technical assistance to unions contemplating merger.
- Long-range analysis of union and industrial trends to determine where merger of unions will be advisable, and laying the groundwork for such mergers.

Boost for Liquid Fuels

Manufacturers of liquid rocket fuels took the spotlight this week in the race to develop huge boosters for space missions.

Aerojet-General (Azusa, Calif.) and North American Aviation (Los Angeles) received contracts from the National Aeronautics and Space Administration to study the economic feasibility of liquid rocket engines with thrusts in the range of 2-24 million lbs. The latter would be able to land a 130,000-lb. payload on the moon, or orbit a 1-million-lb. space station. The plan: check the possibility of using unique designs instead of continuing conventional ones.

Bullpup in Production: Thiokol's Reaction Motors Division (Bristol, Pa.) started volume production of the Bullpup "A" air-to-ground missile. Original contract is for $4 million, but enthusiastic acceptance by the Navy and Air Force reportedly could push the final order to $30-40 million.

Bullpup has a prepackaged liquid engine. The fuel (mixture of amines) and oxidizer (inhibited red fuming nitric acid) are sealed in at the plant; no further servicing is necessary. The model "A" is small (571 lbs.), but Thiokol says there is no upper limit on size, and is working on fuels and oxidizers that could be used for prepackaged liquid engines for upper stages of manned space vehicles.

Servicing Saturn: NASA's Marshall Space Flight Center (Huntsville, Ala.), preparing a second launch complex for Saturn space vehicles at Cape Canaveral, awarded Air Products and Chemicals, Inc. (Allentown, Pa.) a $1.7-million contract for construction of a liquid hydrogen servicing system to be used in fueling upper stages. The 10-month contract calls for fabrication, installation and checkout of the system by late next year.

Saturn's first-stage engines are powered by liquid oxygen and kerosene; upper stages will burn the more powerful liquid oxygen-liquid hydrogen propellant.

Aerojet-General made a move to bolster its solid-fuel production, leasing 25,313 acres in Dade County, Florida. Site gives the company barge access to Cape Canaveral, a must for the large segmented solid-fuel boosters (1-1½ million lbs. thrust) the company plans to build there.

national roundup

Companies

Spencer Kellogg Division of Textron Inc. (Providence) has completed negotiations for the sale of its Bellevue, O., soybean crushing plant to Central Soya Co. (Fort Wayne, Ind.) Kellogg is withdrawing from the soybean crushing business to concentrate its efforts on linseed oil products, livestock and poultry feeds and development of new chemicals. It sold a soybean crushing plant at Decatur, Ill., several weeks earlier (*CW, Oct. 14, p. 33*).

National Starch and Chemical Corp. (New York) has listed its common stock on the New York Stock Exchange. The company, a corn oil refiner, producer of vinyl acetate polymers and copolymers and adhesives, formerly was on the American Stock Exchange.

Hooker Chemical Corp. (Niagara Falls, N.Y.) has offered about $7 million worth of its stock to effect a merger with Parker Rust Proof (Detroit). Hooker is proffering ¾ of a share of its common stock for each outstanding Parker share, plus one $100 share of a new 5% preferred stock for each 20 shares of Parker common. Parker grossed $13 million last year with net earnings of $1.7 million on sales of its metal-treating chemicals, specialized acids, and lubricants.

Alco Oil & Chemical Corp. (Philadelphia) is bidding on a government-owned property in Chattanooga, Tenn., as a site for relocating its Philadelphia thickeners and rubber chemicals plant. The new plant would include facilities to produce agrochemicals of the recently acquired Miller Chemical and Fertilizer Co. (*CW, Oct. 28, p. 23*). The acquisition involved exchange of only 50,000 shares of Alco common, not 500,000 as reported.

Expansion

Piperazine: Jefferson Chemical Co. (Houston) will erect a new unit for production of piperazine at its Conroe, Tex. plant. It is scheduled for completion during the second quarter of '62. Major market for piperazine now is as an anthelmintic (dewormer for swine and poultry). Other uses: drug products (e.g., antihistamines, antimalarials and tranquilizers).

Aromatics: Ohio Oil Co. (Findlay, O.) has awarded a multimillion-dollar contract to Procon Inc. (Des Plaines, Ill.) to build the benzene-toluene facilities for Ohio Oil's subsidiary, Aurora Gasoline Co., at Detroit. Customer for the 20-million-gal./year mixture is Dow Chemical (*CW Business Newsletter, Feb. 25*). New facilities at Aurora will include a 10,000-bbls./day platformer with a Udex extraction unit, a 2,200-bbls./-day, high-pressure Unifining unit. Also, minor modifications of OOC's refinery fractionation equipment at Robinson, Ill., are required.

Silica: Western Mineral Inc. (Salt Lake City) will construct a $350,000 silica reduction mill 50 miles north of Milford, Utah. The silica will be used in Salinian reactors. It will be mined from a deposit found 12 years ago in nearby Beaver County.

Surfactants: Stepan Chemical Co. (Northfield, Ill.) will build a new plant for production of a line of surfactants at Commerce, Calif. Company President Alfred C. Stepan, Jr., says the new plant will make the company the largest integrated producer of surfactants in the West. The plant should be in full production by mid-November.

Plastic Panels: A plant that's said to be the first for commercial production of plastic building panels extruded from polyvinyl chloride resins is to be completed by early '62 by Allied Chemical's Barrett Division (New York). The new multimillion-dollar facility will be located at Barrett's Edgewater, N.J., site.

foreign roundup

Syndets/Pakistan: Futehally Chemicals Ltd. (Karachi) has won a U.S. Development Loan Fund loan to build Pakistan's first detergent plant. Capacity: 1,800 tons/year, in terms of 100% alkylbenzene sulfonate. It's due onstream in January.

Vinylidene Chloride/Belgium: Solvay is building a 10,000-tons/year vinylidene chloride copolymer plant. Production is to start in '62 at the rate of 5,000 tons/-year, to be marketed for cellulosic film and paper coating and packaging film extrusion.

Resins/Holland: Chemische Industrie Synres is building a second plant to make amino resins, synthetic resin dispersions and plasticizers, bringing its capacity up to 35,000 tons/year. Onstream target: second quarter of '62.

TEL/India: Indian Commercial Corp. (Bombay) is launching a new company to produce tetraethyl lead for the first time in India, in partnership with Italy's Societa Lavorazioni Organiche Inorganiche. Proposed output: TEL, 3,000 tons/year; and the raw materials: ethyl chloride, 2,050 tons/year; ethylene dibromide, 540 tons/year; ethylene dichloride, 600 tons/year.

Putnam's Moody checks building progress at new office and plant.

Charlotte:

The thousands of buyers who flocked to the recent North Carolina Trade Fair got a look at a city that is second only to Atlanta as a Southeastern industrial center. And Charlotte, scene of the fair, is growing fast. In chemicals manufacture, its biggest boom is where you would expect it—in specialties for the textile industry.

In industrial-chemicals distribution, Charlotte already has outstripped Atlanta. Charlotte moved $322,766,000 worth of industrial chemicals, according to the last census. Atlanta handled $203,361,000 worth.

The new $1.5-million plant and home office of Putnam Chemical Co., producer of dyes and textile chemicals, underscores the area's appeal for companies in this line of business.

The city's proximity to textile manufacturing gives it a head start in textile chemicals (there are more spindles within a 50-mile radius of Charlotte than in all New England).

In the past year, two sizable textile-chemicals manufacturing plants or warehouses (other than the new Putnam Chemical unit) have been set up in Charlotte: Textile Aniline and Chemical Co., with distribution area of 10,000 sq.ft., and Alliance Chemical Corp., which has manufacturing and distribution units and has a plant in planning stage. Du Pont, already operating a 45,000-sq.ft. warehouse in Charlotte, has just finished an 8,000-sq.ft., $250,000 laboratory-plant to develop textile dyes and finishes. Also in the area: Celanese Corp. Its Textile Division headquarters is the state's largest office building.

Specialties Makers Move In: Many specialties manufacturers are also setting up shop in Charlotte. New plants located there in the past year include Interchemical Co.'s 53,000-sq.ft., $1.5-million, printing inks plant; Owens-Illinois' $1-million Closure and Plastics Division plant (supplying plastic containers to Procter & Gamble's Clorox household bleach plant just a few miles away), and Reeves Brothers' new, 275,000-sq.ft. urethane foam plant.

Charlotte's long-established consumer-specialties producers include

Southern Spearhead for Specialties

large national firms—e.g., Union Carbide (batteries) and P&G—plus several local firms: Radiator Specialty Co. (home office in Charlotte), which makes automotive and other specialties that grossed $10 million in '60, Thermoplastics Corp. (plastic pipe, fittings, extrusions); and Fulbright Laboratories, Inc. (manufacturer of water treatment chemicals).

There are more than 50 chemical producers in the area (*table p. 51*). Producers' breakdown: textile chemicals (15); fertilizers (7); printing inks (2); paint varnish and thinners (2); plastics fabrication and extrusions (5); household products (2); oxygen and other gases (4); miscellaneous (17)—including glue, catalysts, water treatments, latex compounds, auto chemicals, urethane foam, synthetic resins, patent medicines and roofing compounds).

While the city is 91st in the U.S. in population and 29th in total wholesale volume ($1.7 billion), it now rates fifth in wholesale market of industrial chemicals ($369 million in '58*).

How does this town, relatively small by New York-Chicago standards, do so much business in chemicals? What does Charlotte have in addition to its textile-center location?

For one thing, the area's supply of labor and its consumer market are sizable. The city's total metropolitan population is estimated at 211,000—much less than Atlanta's 1 million. But considering today's rapid transportation and the modern, big-market concept, Charlotte looks good as a distribution point because its 75-mile-radius population (2,216,600) is greater than that of Atlanta, Indianapolis, or many other well-known big cities.

Charlotte also has support from the state of North Carolina, internationally known for success in bagging new industry. The state has shown the South how to profit from modern attitudes on racial problems, corporate taxation, etc. Companies can build branch plants in the state and move employees in without fear of facing collapsed school systems or having to juggle their corporate tax structures.

Charlotte also has a cultural atmosphere that attracts management people. A modern civic auditorium, coliseum and adjacent merchandise mart are the envy of major cities in the Southeast.

The mart, rushed to completion for the recent trade fair, typifies the zeal that Charlotte businessmen have displayed in building their city into a big-business center.

Putnam Switches: Leon Moody, executive vice-president and general manager of Putnam Chemical, a division of Badische Aniline- & Soda-Fabrik (West Germany), has adopted the Charlotte spirit within a few weeks.

Putnam Chemical's home office and manufacturing headquarters for years had been in Beacon, N.Y. The company had served the Southeast from a small sales office in Charlotte. Now it's moving home office and warehousing-manufacturing to Charlotte, maintaining only a small sales office in the East.

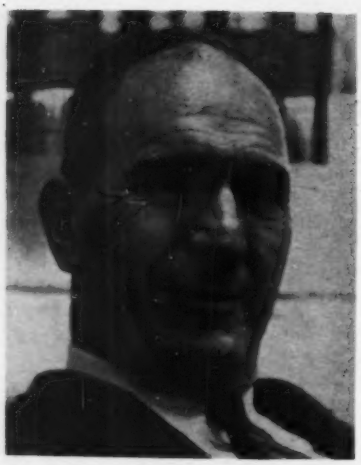
Moody, conducting an inspection tour of construction work at his northeast Charlotte plant site (*picture, p. 48*), cites several reasons for locating in Charlotte:

Market: "Of course, the main reason why we came to Charlotte was to be close to the market. The center of textile manufacturing has moved south and we're moving with it.

"But there's also an advantage to

* Figures from '58 census of business—SIC product-category 5029.

Set in the heart of the Southern textile industry, Charlotte is a big little city with bustling look.



Charlotte's Gilchrist credits distribution network for chemical growth.

doing business in a big-little city. Yesterday we had some of our company officials fly in for some important business transactions. In Charlotte, they saw our bankers, our lawyers, our building people, and others—all within half a day. Many of these contacts had offices in the same block. How long would that series of meetings have taken in New York City?"

Labor: "I'm very pleased with the labor talent we've found here. I don't think we're going to have any problems along that line. For example, I recently advertised for a bilingual secretary, expecting the job would be a tough one to fill. I received 12 applications, and three of the people could have done the job well."

Aid to industry: "We have had excellent cooperation from the Chamber of Commerce, local merchants, and others. One thing Charlotte doesn't offer is special tax concessions for new firms. It's a system in which everyone gets the same treatment. That way, you know your competitor won't come in and drive a harder bargain."

State and city: "North Carolina's Research Triangle (between Durham and Raleigh) will be a definite asset. Its facilities will grow as we grow.

But Moody also calls attention to a disadvantage of locating in Charlotte: "Being in Charlotte does put us a little too far from New York, which is still the country's central merchandise market. Also, we miss being near our competitors, to swap ideas, and to sell to each other.

"However, the airport is nearby, New York is just a couple of flying hours away, and Charlotte is big enough to have good air connections."

Competition, Too: While the executive offices of many companies competing with Putnam may be many miles away, there's no danger of Moody's forgetting that those companies are going after the same market. Standing on the west side of his lot, he can see the new warehouse-manufacturing building being built next door by Carbic Hoechst Corp. In the same industrial district, Ciba Co. has purchased a large tract of land for a similar manufacturing and distribution center.

A few miles further west of the Putnam plant site is one of the giants of Charlotte's textile-chemicals complex, Southern Dyestuff Co., division of American-Marietta. The plant buildings dot a 450-acre tract on the Catawba River and 50 of these acres are under one roof. The firm makes dyestuffs, textile chemicals, and organic intermediates (chlorobenzene derivatives).

But even with that competition, at least one Charlotte CPI man insists that the smaller textile-chemicals makers are in town to stay.

Patrick Gilchrist, Charlotte's "Mr. Chemicals" (he has been president of the Chamber of Commerce, Charlotte Man of the Year, and is currently chairman of the chamber's Industrial Committee), has been making chemical specialties during most of his business life. His firm was started by his father in 1911.

Because of this long experience Gilchrist is a good spokesman for the smaller chemical maker.

At Charlotte Chemical Laboratories, Inc., Gilchrist and his brother make textile chemicals. A division (at the same location) named Chemical Development and Estimates Corp. makes other specialties, including vanadium catalysts for contact sulfuric acid plants.

Gilchrist credits location and transportation with having fostered the city's chemicals business: "In '20, dyestuffs from New Jersey and other Eastern points had to go to Atlanta first, then back to Charlotte. A group of interested businessmen formed the Charlotte Shippers and Manufacturers Assn. (still functioning) and were able to get rates established direct to Charlotte. After that, the dyestuffs shipped to our area came through Charlotte."

As for manufacturing, Gilchrist says, "Charlotte originally had no reason to be a chemical manufacturing town. We have no oil, no sulfur, no salt. But distribution attracts manufacturers. They can get any chemicals they need right here in Charlotte."

While Charlotte rates high in general attractiveness for the people who run the plants, and work in them, top CPI management, when considering new-plant locations, is concerned with more important plant-site factors. Statistically, Charlotte measures up this way:

- Transportation: The community has four Class I railroads, 102 truck-lines. Only Chicago and Los Angeles top it as a trucking center. Five airlines serve Charlotte with 106 daily flights; seven bus companies have 160 daily departures; and the four railroads have 12 daily passenger departures.
- Geography: Charlotte's altitude is 765 ft. Average temperature is 60.80 F, the annual rainfall is 46.05 in. and its average frost-free period is 237 days (March 16 to Nov. 8).
- Labor: Charlotte itself is small enough, has good enough roads and streets to attract industrial labor from a wide area. The county, Mecklenburg, has an estimated industrial labor supply of 6,500. Total available force in Mecklenburg and seven adjacent counties is 22,330. Of these, 8,675 are skilled or semiskilled and 12,680 are considered trainable for jobs requiring skills.

Total number of workers in manufacturing in Mecklenburg County is 27,200. Average wage is $69.43/week. Employees in manufacture of chemicals and allied products total 2,200—up 4.8% in the past year. They average $63.02/week.

- Utilities: Duke Power Co., one of the 10 largest power companies in the U.S., has the lowest industrial power rates of any major private power company east of the Rockies. Commercial service rates start at 0.80¢/kwh. for the first 10 kwh.; 0.04¢ for the next 50; 0.035¢, the next 140; 0.03¢, the next 260; 0.025¢, the next 1,540; 0.017¢, next 8,000; 0.0135¢, the next 10,000.

Natural gas rate in Charlotte is 0.061¢/100 cu.ft. when the plant uses more than 50 mcf.; 44.5¢/mcf. when more than 150; 29¢/mcf. when over 7,500.

- Water: Charlotte's water supply

comes from the Catawba River, a few miles west of the city, which is today using only 2% of its raw-water supply.

• Taxes: The tax schedule for business and industrial property in the city is $1.50/$100; in the country, $1.61/$100. Property inside the city is taxed by both city and county governments.

State taxes and fees include a charter tax, a corporate income tax and an intangibles tax. The charter tax is 40¢/$1,000 of authorized capital stock, with maximum payment of $500 for foreign, $1,000 for domestic corporations.

State corporate income tax is computed at 6% of taxable net income. Taxable income is based on a ratio of property, payrolls and sales within the state, compared with property payrolls and sales that are made outside the state.

The state's intangibles tax ranges from 10¢/$100 on money on deposit, to 25¢/$100 on market value of stock shares.

A franchise tax is levied on business corporations at the rate of $1.50-$1,000 of the largest of three alternate bases: (1) the portion of the capital stock, surplus and undivided profits allocable to the state; (2) assessed value of property in the state, including taxable intangible property; and (3) book value of real and tangible personal property in the state, less any debt outstanding that was created to acquire or improve real property.

• Financial: Charlotte has the only Federal Reserve Bank (fifth district) in the Carolinas. Seven banks are headquartered in the city.

Good Eye: Charlotte's value added by manufacturing in chemicals has increased almost threefold since the mid-'50s and shows no sign of slowing this pace. In a city that calls itself "Spearhead of the New South," business leaders appear to have aimed at, and found, a bull's-eye in chemicals.

Among CPI Firms in the Charlotte Area

- Acme Soap and Chemical Co. (textiles, soaps and chemicals)
- Air Reduction Sales Co. (gases)
- American Cyanamid Co. (textile and paper chemicals)
- Arnold, Hoffman & Co. (textile chemicals)
- Brown Solvents Corp. (lacquer thinners)
- Champion Manufacturing Co. (glue)
- Charlotte Chemical Laboratories (textile chemicals)
- Chemical Development & Estimate Corp. (catalysts)
- Chemical Processing Co. (textile chemicals)
- Clorox Chemical Co. (household bleach)
- Consos, Inc. (textile finishing compounds)
- E. J. Feeley Co. (textile dyestuff)
- Fulbright Laboratories, Inc. (water treatments)
- General Latex & Chemical Corp. (latex compounds)
- Goodyear Paint and Varnish, Inc. (paints and varnishes)
- Hertron Chemicals Co. (waxes and cleaners)
- Hood Chemical Co., Inc. (household products)
- Imperial Dye and Products Co. (chemicals, textile oils)
- Linde Co. (gases)
- National Cylinder Gas (gases)
- Owens-Illinois Glass Co. (plastic bottles)
- Radiator Specialty Co. (automotive chemicals)
- Reeves Brothers (urethane foam)
- Reichhold Chemicals, Inc. (resins and emulsions)
- Piedmont Chemical Corp. (textile chemicals)
- Planters Fertilizer & Phosphate Co. (fertilizer)
- Putnam Chemical Co. (dyestuffs and textile chemicals)
- Sinclair and Valentine Co. (printing inks)
- Southern Dyestuff Corp. (dyestuffs and textile chemicals)
- Standard Chemical Products, Inc. (textile chemicals)
- Stein, Hall & Co., Inc. (resins)
- Union Carbide Consumer Products (dry cell batteries)
- Virginia-Carolina Chemical Corp. (fertilizer)
- I. G. Wallace & Son (fertilizer)
- Wica Chemical, Inc. (textile, paper chemicals)
- Wilmar, Inc. (auto and janitorial chemicals)

Cosmetic Headstart

Clairol Inc. (Stamford, Conn.), world's largest manufacturer of hair-coloring products, may get into other areas of cosmetics—e.g., lotions, face powders, eye shadows, lipsticks, make-up powders.

The company, which recently opened enlarged hair-coloring laboratories in Stamford, appears to be gearing for an assault on firms with broader product lines — e.g., Revlon and Max Factor.

Clairol could probably compete successfully in such lines because of its work with colors (it's now synthesizing some of its own dyes).

Another reason why Clairol would want to add products to its line: its heavily promoted (Does She or Doesn't She?) hair-coloring products have apparently won good consumer recognition. When this happens in the cosmetics field, manufacturers usually try to squeeze as many items under the advertising blanket as possible.

Based on statements given at the dedication of the new laboratories, it appears that the company, a subsidiary of Bristol-Myers, is working on products that dye and thicken hair fibers simultaneously; one-time tints that rinse out with each wash; hair colorings for men; and greatly simplified hair permanents for home and professional use.

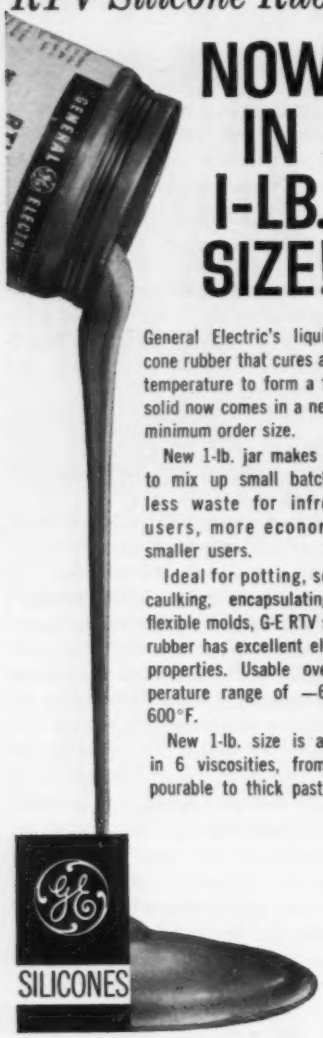
New Brighteners

Two new fluorescent brighteners — one for polypropylene, the other for acrylics — have been developed by General Aniline & Film Corp. (New York).

The brightener for polypropylene, called Blancophor MO-89, is said to be suitable for the dyeing of polyolefin fibers and for application in the melt. According to R. J. Holmes, product line manager of GAF's General Dyestuff Division, no pretreatment or posttreatment is required when using the new material. Until now, elaborate processing steps were required to dye polypropylene (*CW, Jan. 7, p. 43*).

The brightener for acrylics joins a small group of materials (e.g., Geigy's Tintopal and Ciba's Uvitex A-Double) available for such use. Holmes thinks the new product, tradenamed Blancophor AM-80, is superior to either of

RTV Silicone Rubber



NOW IN 1-LB. SIZE!

General Electric's liquid silicone rubber that cures at room temperature to form a flexible solid now comes in a new 1-lb. minimum order size.

New 1-lb. jar makes it easy to mix up small batches — less waste for infrequent users, more economy for smaller users.

Ideal for potting, sealing, caulking, encapsulating, and flexible molds, G-E RTV silicone rubber has excellent electrical properties. Usable over temperature range of —65°F to 600°F.

New 1-lb. size is available in 6 viscosities, from easily pourable to thick paste.

For full information, contact the distributor nearest you:

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Electrical Specialty Co., 158 Eleventh St.

Chicago
Federal Insulation Co., 549 W. Randolph St.

Detroit
Insulation & Copper Sales, 15605 Woodrow Wilson

Jersey City
Smooth-On Mfg. Co., 572 Communipaw Ave.

Floral Park, Long Island, N. Y.
Punt, Inc., 160 Woodbine Ct.

Philadelphia
Smith of Philadelphia, 1024 Race St.

Chagrin Falls, Ohio
Electrolock, Inc., 28 North Main St.

Milwaukee, Wis.
R. J. Wittenburg, 4805 W. Center St.

or write: General Electric Company, Silicone Products Dept., Sec. EE1158; Waterford, N. Y.

GENERAL ELECTRIC

these. Like the firm's other new brightener, the AM-80 is used in extremely small quantities (0.01%), requires no involved process steps.

The composition of the new products is still a trade secret. The acrylic brightener might be a reactive dye (*CW, March 25, p. 53*) since GAF is known to be working with such materials. All that Holmes will say is that they're "a new class of chemical brightening agents unrelated to products used for this purpose (i.e., brightening) in the past." The company has applied for patents on what will apparently be a whole new family of dyes built on the new chemical structures.

Right now, the brighteners are supplied as a white powder but they may be supplied in other forms in the future. Prices aren't set yet but are expected to be in the $30/lb. class. Availability of semicommercial quantities is planned for early in '62.

PRODUCTS

Pearl Pigment Powder: Rona Pearl Corp. (East 21st at East 22nd St., Bayonne, N.J.) is in pilot-plant production of a nonlead synthetic pearl pigment in dry-powder form. It's called Pigment NLD, is claimed to be free of all solvents, plasticizers, resins and other vehicles, and can be used at concentrations of between ¼-½% to produce pearl effects.

•

Surfactant Series: Universal Chemicals Corp. (Central Falls, R.I.) is marketing a series of fatty nitrogen compounds (fatty imidazolines) under the tradename Fatchemco. They're used as corrosion inhibitors, petroleum additives, antistatic agents and bases for quaternary ammonium compounds. They're said to consist of the lowest-cost tertiary amines commercially available.

Universal is also offering a new class of amphoteric surfactants, tradenamed Uniterge, that are immune to heavy metal ions, exhibit fungicidal, algaecidal and bactericidal properties and are soluble in 20% caustic and 20% hydrochloric acid.

•

Frying Pan Coatings: Two new products for frying pan coatings have been recently brought to market. One, a product of American Machine & Foundry (New York), is called Pan-Magic. The nonstick coating is packaged as an aerosol, sells for $1.98 for a 3-oz. can (good for eight pans). Another newcomer is Devcon Corp.'s (Danvers, Mass.) No-Stick, which is now being marketed at $1.20 for a 6-oz. can.

•

Paraffin Inhibitor: Hagan Chemicals & Controls (Hagan Center, Pittsburgh, Pa.) is marketing a complex organic formulation designed to inhibit paraffin deposition and to disperse existing accumulations in lines and tank bottoms. The compound is tradenamed Hagan Paraffin Inhibitor, is packaged as a liquid (density: 7 lbs./gal.) and is currently being supplied in 5- and 50-gal. drums.

•

Cold-Weather Plastic Tape: A pressure-sensitive plastic tape for electrical wire splicing that will remain flexible at temperatures as low as —50 F has been developed by Permacel (New Brunswick, N.J.) under the name Permacel 295. It has an over-all thickness of 8.5 mils, is available in 36-yd. lengths and in various widths.

•

Adhesive for Polyolefins: A thermosetting adhesive for bonding polyolefins is being marketed by Radiation Applications Inc. (36-40 37th St., Long Island City 1, N. Y.) under the tradename Raiseal 5002. It's said to be effective on polyethylene surfaces without pretreatment by flaming, corona or chemical dips. The three-component system sells for 2.75/lb. in gallon quantities.

•

Plasticizer: Harflex 340, a polar polymeric plasticizer for use with polyvinyl acetate, has been developed by Harchem Division of Wallace & Tiernan Inc. (Belleville, N. J.). It's said to impart wet tack, specific adhesion and permanency not previously attainable. It has Food & Drug Administration approval for food usage.

•

Silicone Rubber: Furane Plastics (4516 Brazil St., Los Angeles) is offering, on an experimental basis, metal-filled silicone rubbers that can be cured at room temperature. Product line-up: iron powder-filled silicone (H-1759-Fe); brass powder-filled silicone (H-1759-Br); aluminum powder-filled silicone (H-1759-Al); copper powder-filled silicone (H-1759-Cu);

IT'S A SWIRL WORLD

By applying the basically simple technique of swirling liquids and liquid/solid mixtures at extremely high speeds, Sharples Centrifugal Systems are able to effect accurate, continuous and controlled separation required in the manufacture of products ranging from penicillin to blood plasma . . . from face powder to solid fuel . . . from diesel oil to salad oil . . . from rare earths to everyday plastics . . . from powdered metals to fertilizer pellets . . . from instant coffee to sugar.

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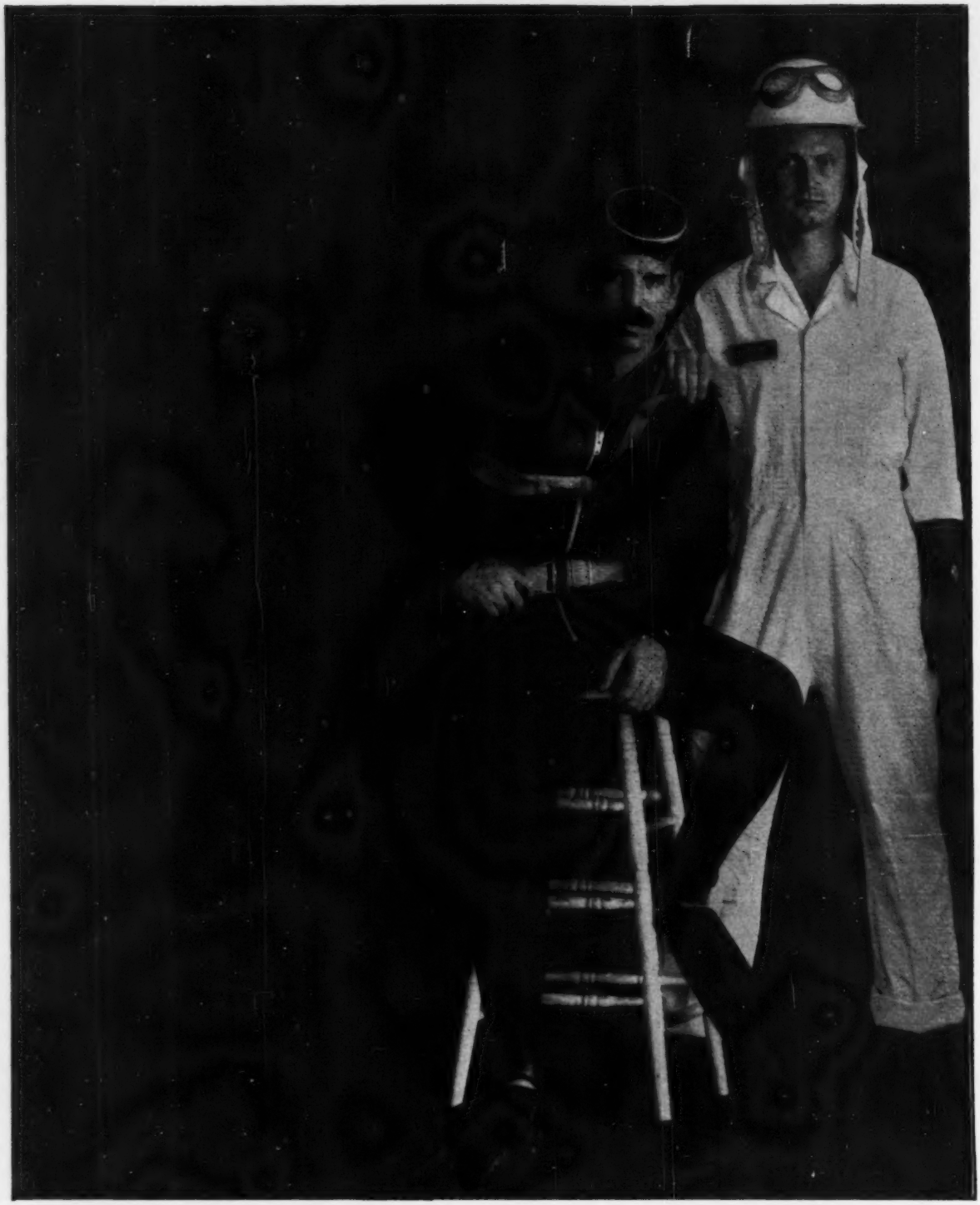

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1 Endurance counts. Especially when an industrial coating must stand up to chemicals or organic liquids. Allied Chemical's A-C® **POLYETHYLENE** does just that. And it also adds important benefits to house paints: grease resistance, washability and color development.

2 Speed counts. Today coatings must flow on quickly . . . and dry fast. Allied Chemical's **AROMATIC INDUSTRIAL SOLVENTS** help achieve both ends. And they also reduce viscosity, aid in blending less compatible components, and provide many other advantages.

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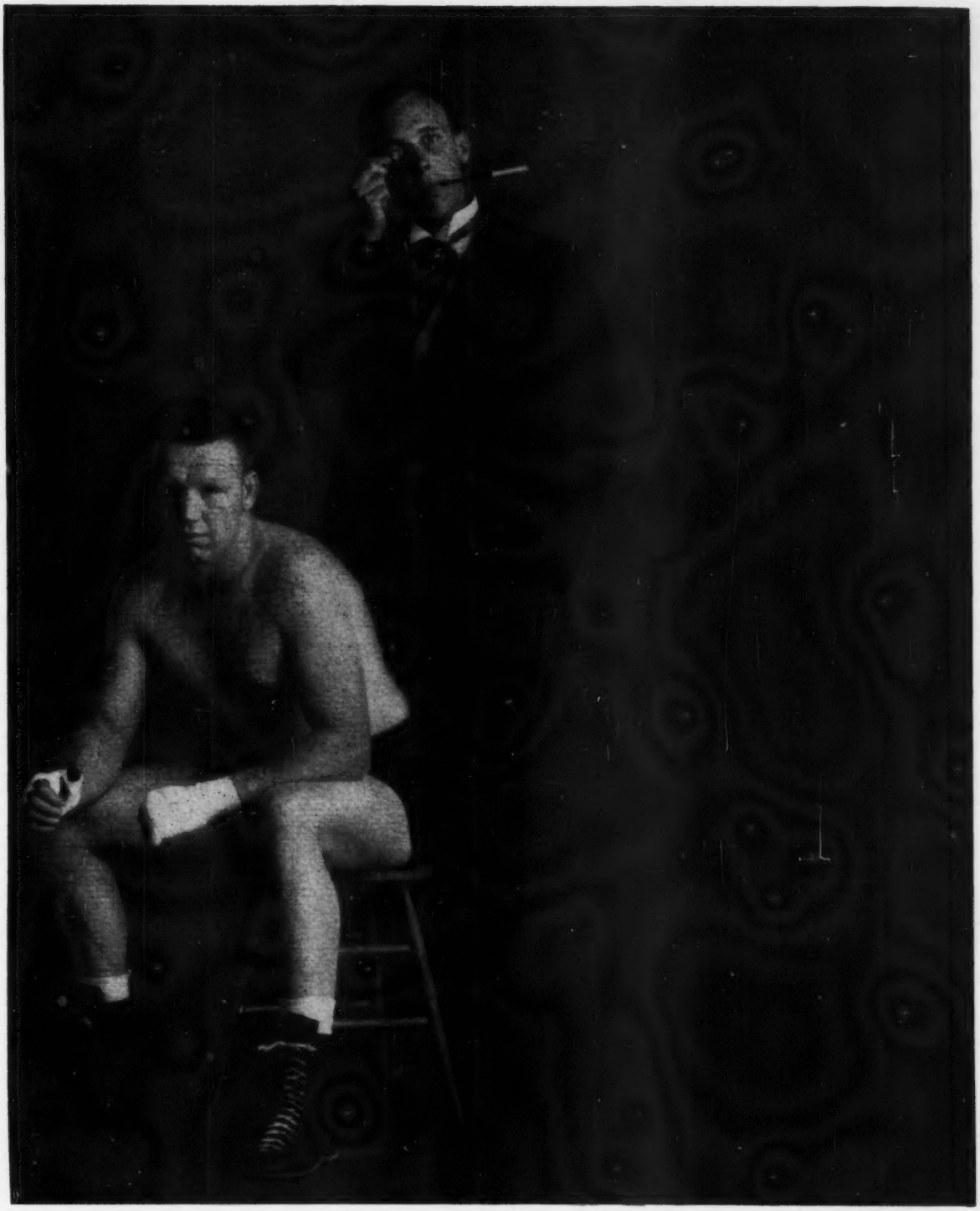

3 Toughness counts. For coatings that can really take it, you need Allied Chemical **PHTHALIC ANHYDRIDE.** It builds strength into paints . . . improves color retention, adhesion and durability, too. And it's so pure that it doesn't affect processes or end products.

4 Polish counts. Wouldn't you like to see a truly mirror-like finish on your nitrocellulose lacquers? Then formulate with **"ELASTEX" 50-B PLASTICIZER** and **"ELASTEX" DCHP.** They're just two of many Allied Chemical Plasticizers designed to help you make better coatings.

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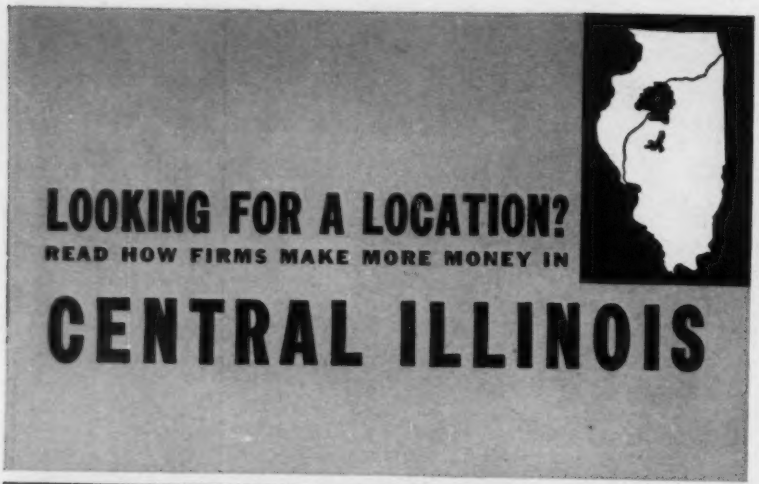

Muirson Label Company first selected Peoria as a profit-making location in 1930. Expansion required a new plant in 1961 — and again Muirson chose Peoria, building in the new Pioneer Industrial Park to serve label and printing customers throughout the U.S., Canada, Mexico and overseas.

Nutrena Mills, Inc. finds a double advantage in a Central Illinois location. The by-products of nearby industries provide ingredients for livestock feeds, easily distributed from the Peoria "highway hub" in the center of one of the world's great agricultural regions.

Chris Hoerr & Son Co. recently occupied a huge, modern food warehouse built in East Peoria, Ill. This company reports that location midway between Chicago and St. Louis means rapid availability of goods, brought in quickly via excellent rail and truck facilities.

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Mark B. Townsend
Area Development Director

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and the catalyst for these systems (H-1759B).

•

Cough Tablet: Gillette Laboratories (Chicago) is introducing through retail drugstores a chewable cough tablet, Thorexin Coftabs. It's sold in a 15-tablet box, contains the antitussive ingredient, D-methorphan (Dextromethorphan hydrobromide).

•

Tungsten Disulfide: Sylvania Electric Products' Chemical & Metallurgical Division (Towanda, Pa.) is marketing, in commercial quantities, tungsten disulfide for use as a high-temperature lubricant and catalyst. The material is a soft, grayish-black powder, forms adherent, continuous films on surfaces. It exhibits lubricating properties similar to those of molybdenum disulfide and graphite, but has superior oxidation resistance. Potential applications include use as a petrochemical catalyst in such reactions as hydrogenation, isomerization.

•

Phototypesetter: A new combined developer and fixer formulated for phototypesetting is being sold by Cormac Chemical Corp. (34-22 35th St., Long Island City 6, N.Y.). Unibath CC-11 reportedly permits the processing of waterproof phototypesetting paper with one solution in less than 90 seconds; the conventional three-stage process, says Cormac, takes up to five minutes.

•

Rosin Flux Remover: A rosin flux remover (tradenamed Reflux) is being marketed by Supracote Development Laboratory (17 Main St., Bloomingdale, N.J.). It's said to be 35% faster in operation and 40% lower in cost than carbon tetrachloride and similar materials. It's nonflammable, reportedly removes rosin flux from printed-circuit boards in about 6½ seconds/board, compared with 10-second action of carbon tetrachloride and other proprietary formulations.

•

Silicone Rubber: Union Carbide's Silicones Division has added a new silicone-base rubber compound to its product line. Called KW-1920, it's said to combine low-temperature flexibility at —120 F, resists oils and other fluids. The material can be compounded into silicone rubber stocks to make seals, diaphragms, gaskets and other parts for missiles and military uses.

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Washington
Newsletter

CHEMICAL WEEK
November 4, 1961

Military services will increase the status of their laboratories. It will give labs more direct authority over research and development projects and, in so doing, will increase pay scales for scientists and engineers on Defense Dept. payrolls. Management of the laboratories will be streamlined to limit the authority of nonscientific administrators.

Involved in the move are such major chemical installations as the Army Chemical Research and Development Laboratories (Ft. Dedrick, Md.), and the Chemical Corps Proving Ground (Dugway, Utah). The Pentagon is studying the establishment of guide lines to clarify their roles. But this does not imply a cut in farmed-out research to private industry. Defense Dept.'s chief purpose: to bolster sagging morale of its civil service scientists and engineers; their pay scales lag behind industry's.

The outlook is for continuation of the present trend in defense research and development: roughly 25% is performed in the military's own installations, some 5% by private nonprofit research organizations and the remaining 70% by industrial contractors. This is the division of approximately $5 billion worth of research, development, test and evaluation orders to be placed by the Pentagon during the current fiscal year.

•

The basis of the Administration's transportation policy was delivered to the White House this week. The Commerce Dept. study probably will not be released officially for some time. But it includes two major recommendations that could have far-reaching effects on shipping rates:

(1) Ask Congress to strengthen the rate-making standards of the Interstate Commerce Act to prevent destructive rate-cutting.

(2) Ask Congress to consider imposing user charges on barge lines to help recoup federal investment in waterways.

In the first instance, Commerce is concerned particularly about setbacks suffered in recent years by coastal water carriers as a result of rail rate-cutting. This is in line with requests by motor and water carriers that Congress halt the intensive rate-cutting program carried out by the railroads in the past three years. Major shipping organizations oppose any change in government rate-making rules.

As for user charges, Congress this year increased taxes on truckers to help pay for new highways. The President has asked for similar charges on airlines but Congress has not yet acted on this. Commerce urged that Congress project this another step and consider whether user charges should be assessed against barge lines. Barge operators have warned that such action would lead to higher freight rates.

•

An extra $268 million for promotion of public health is included in the fiscal '62 budget by President Kennedy. The total, included in

Washington Newsletter

(Continued)

the annual Budget Bureau review of Congressional appropriations released this week, is $1.2 billion for health activities.

About three-fourths of the $268-million increase over last year is for the medical research and training programs of the National Institutes of Health. The rest of the increase will go for such things as community and environmental health, construction of hospitals and waste treatment plants, Food and Drug Administration activities and grants for maternal and child health.

•

Easier short- and medium-term credit by U.S. exporters will be the result of a new program disclosed by the Export-Import Bank and the White House. Under it, exporters will be able to obtain cheaper and wider export credit insurance through the new Foreign Credit Insurance Assn., formed by 20 private insurance firms and the Export-Import Bank. The private companies will assume normal risks while Ex-Im will assume political risks.

Credit terms—up to 180 days—will put U.S. exporters on an equal footing with their foreign competitors so far as credit is concerned. This has become increasingly important to U.S. export sales as European delivery dates become shorter. Credit terms are likely to play a much bigger role in the future in decisions by non-U.S. firms as to where to buy.

•

The AEC has dropped plans to seek new financial incentives to encourage construction of private nuclear power reactors. Officials feel Congress is in no mood to grant such incentives—chiefly because of the bitter battle this year over the Hanford reactor. Before this fight, AEC had been studying the possibility of new capital grants, additional operating subsides, a fast tax write-off or even the financing of long transmission lines. Staff studies along these lines were all but completed when Hanford came to a head. Now, all bets are off. It would take a major change in Congressional sentiment to get AEC to reinstitute its plans.

•

Expansion of the cost-plus-incentive-fee type of contract will be revealed soon by the Defense Dept. The Pentagon is putting the finishing touches on a new procurement policy designed to spur contractors into the assumption of higher risks in return for greater profits. Under the program, a contractor who completed a project at below the original estimate would get a share of the saving. If he went over the estimate, his profit would be cut.

•

The unexpectedly large demand for flu vaccine this fall caught the Public Health Service by surprise—and left the country facing a serious shortage of the shots. But no one is blaming the drug companies. PHS officials say the pharmaceutical houses that make the vaccine have produced twice as much this year as they did last year and are doing everything possible to fill the gap. The vaccine shortage is expected to continue through the winter, however.

We make every grade of salt—for customers coast to coast

The five salt shapes magnified and stylized above (Cube and Octahedron at the top, Round in the center, and Dendritic and Flake at the bottom), are some of the crystal forms of salt which may be important for your needs. Morton offers more than 100 grades of salt, with many different physical characteristics. Morton, the only nationwide salt company, offers you 10 salt sources—with service through more than 30 sales offices and warehouses.

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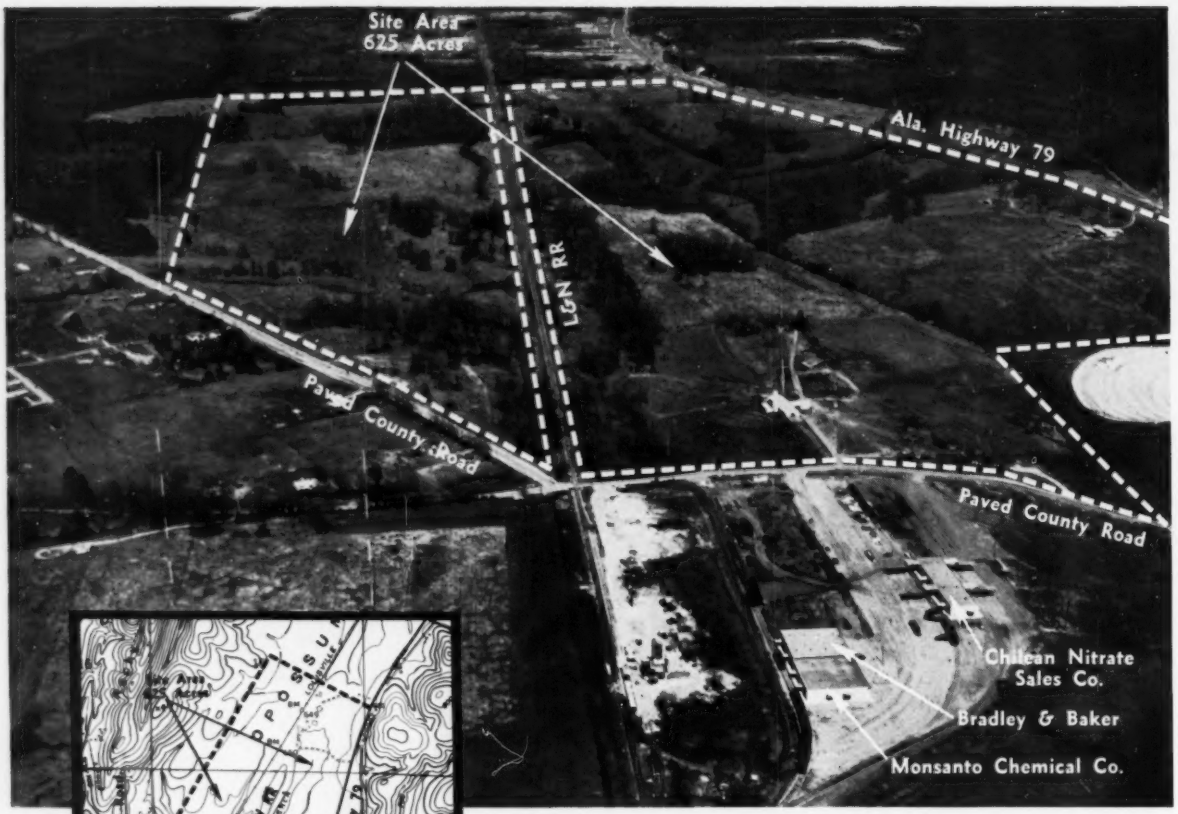

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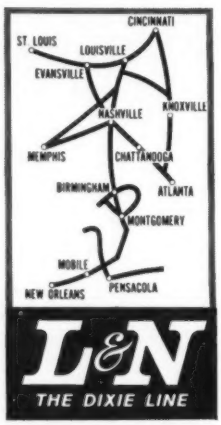

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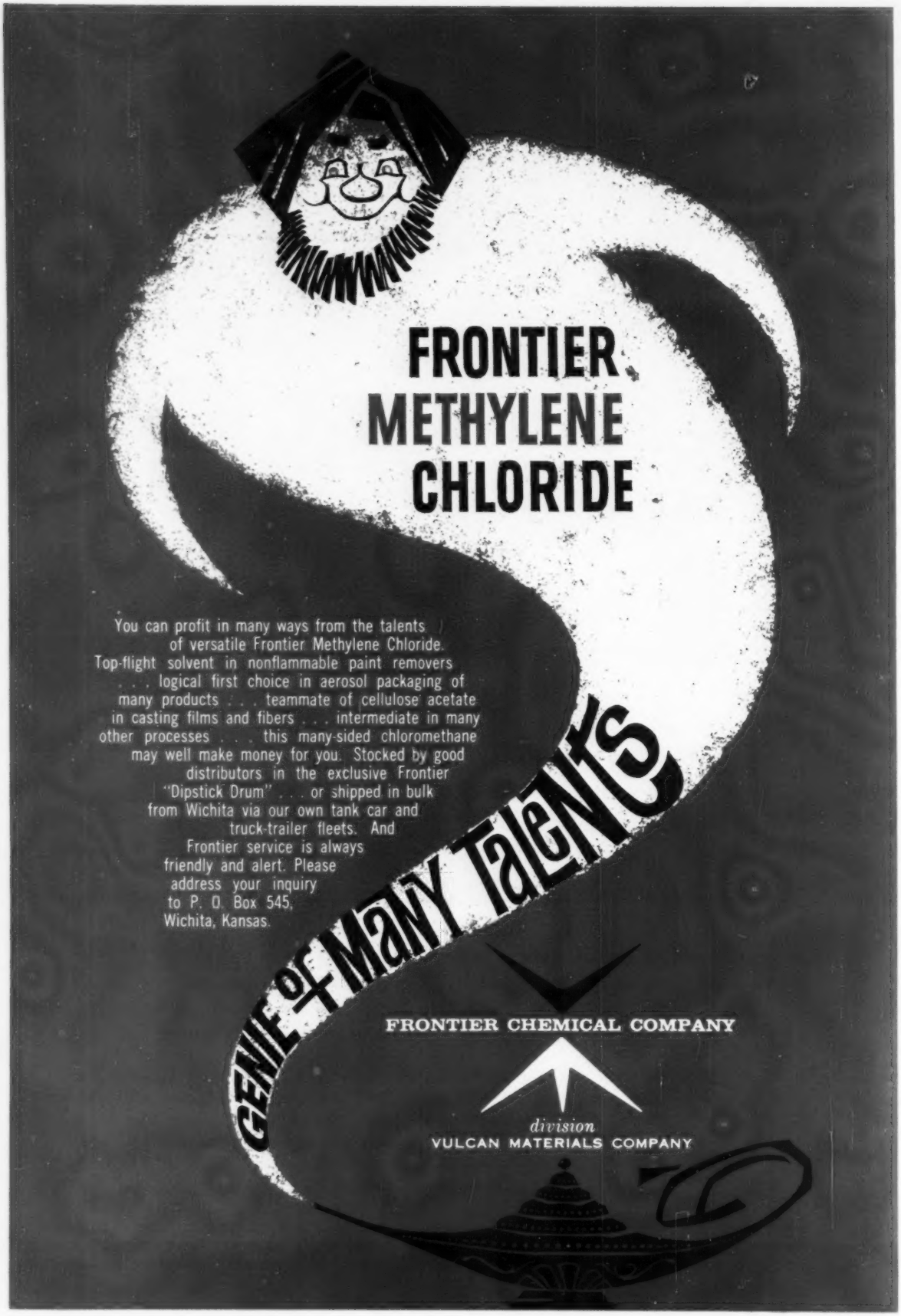
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SILICOLOGY *Studies in Silicones*

HOW THESE TIME-TESTED MATERIALS CAN WORK FOR YOU

Foams are growing—and Silicones keep them in shape!

Five million pounds in 1955 . . . 125 million pounds in 1961 . . . 250 million pounds are predicted for 1965. Yes, the flexible polyurethane foam market is growing in a great big way.

The rigid foam market is spurting ahead, too. In fact, business barometers are predicting even more spectacular growth than with flexible foams, thanks to its expanding use for insulation and construction.

The astonishing growth and acceptance of polyurethane foams based on polyethers would not have been possible without silicone surfactants. That's because they control *growth* and *uniformity* of the foam cells. This is particularly true in the use of organo-silicone copolymers in one-shot foam systems.

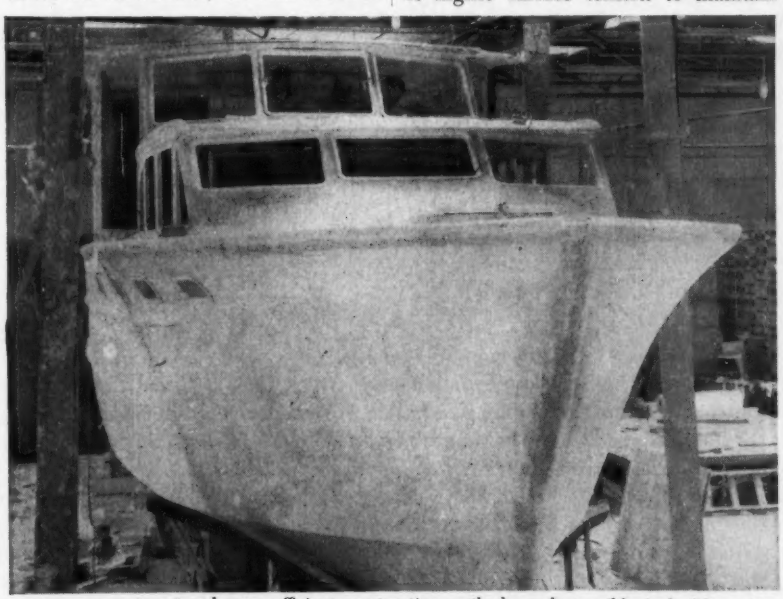
FUNCTION OF SILICONE SURFACTANTS

Evidence has been found of the positive effect of silicone surfactants upon bubble formation, stability and size. Their action is apparently two-fold:

1. In one-shot foams, the first effect of soluble organo-silicone surfactants on bubble formation is a reduction in the energy required to form new surfaces. The silicone lowers the surface tension of the system so that generated gas can form bubbles more easily. Such an effect makes conditions favorable for the formation of fine uniform cell structures.

2. The primary importance of silicone surfactants in one-shot systems is, however, their action in stabilization of the foam. It is important, during rise, to equalize surface tension over the entire surface of the bubble. This requirement is met by the unique action of organo-silicones, which impart the needed film resilience. As they expand, bubbles tend to distort and thin spots form at points of greatest expansion, weakening the bubble wall. This causes the surface concentration of silicone at the stretched areas to fall, and surface tension increases momentarily. However, the silicone, more concentrated on the areas where the film is relatively undistorted, maintains a lower surface tension at these areas. Since liquid flows toward points of higher surface tension to maintain equilibrium, the thin spots will be "healed." This constant self-healing (film resilience) is a necessary condition for growth of stable foams.

Moreover, this self-healing not only provides film resilience necessary for the foam to support itself until gelation begins, but it helps compensate for chemical and mechanical variables inherent in foam manufacturing. Many manufacturers have found that addition of more than the minimum amount of silicone needed under ideal conditions affords essential latitude and contributes greatly to economical operation.



Costs were reduced and more efficient construction methods made possible in building this 55-foot yacht, thanks to rigid polyurethane foam. Sprayed on corrugated glass fiber planks, polyether foam provides greater strength, insulation and superior flotation for the yacht's hull.

UNION CARBIDE LEADS IN SILICONE SURFACTANTS

UNION CARBIDE is the leading supplier of silicone surfactants for flexible foams. In fact, it was UNION CARBIDE's pioneering efforts in developing organo-silicone surfactants that made the one-shot foam process possible. And this background of foam surfactants technology has provided the basis for leadership in the rigid foam field today.

UNION CARBIDE has a full line of silicone surfactants for producing flexible, semi-rigid and rigid polyurethane foams. Let the SILICONES MAN help you make the right selection for your system.

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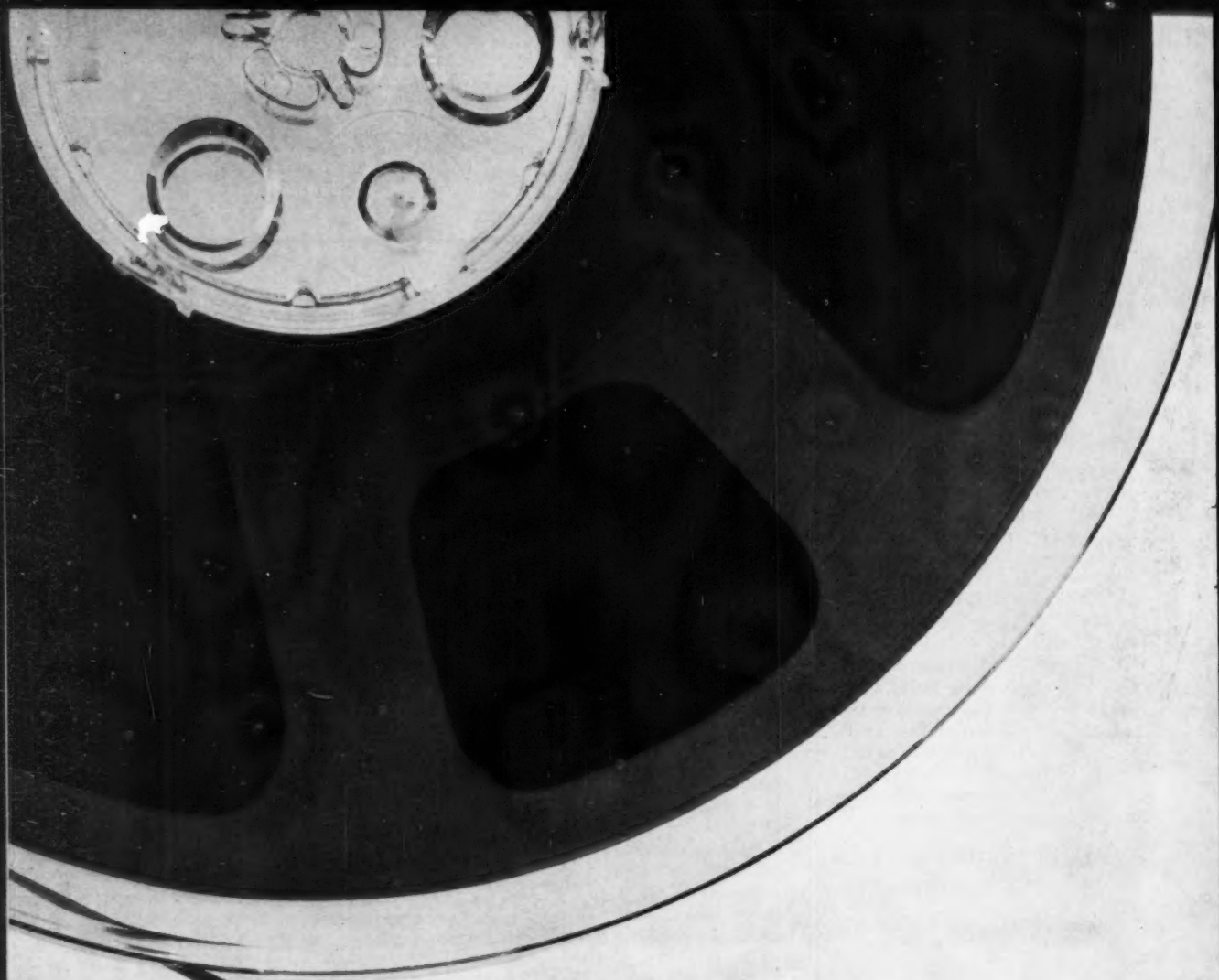

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IMC's Ware champions retirement pay for board members. Object: to get top men of other fields.

Boardroom Doors Beckon

An unusual deferred compensation plan for directors, approved by International Minerals & Chemical Corp. (Skokie, Ill.) stockholders last week, reflects a trend among chemical process companies to rely more heavily on "outside" directors than at any time in the past.

The plan gives 10 of the 11 IMC directors $10,000/year, payable on retirement. President Thomas Ware is also a board member but is not included in the plan. These 10 board members, all outside directors—hold no other position in the company—have been getting $3,000/-year.

Says IMC: "The new plan is in line with the latest trend in industry and with the company's long-time thinking that corporations and stockholders are best served by outside, independent directors; and that suitable compensation is necessary to attract top men."

Ware feels that adequate rewards for board members are long overdue. He tells CHEMICAL WEEK, "I'd like to have the directors share in both the pains and pleasures of the business." The new plan will help to develop a proprietary interest. Because outside directors frequently have high-level executive positions in their firms—getting $50,000-100,000/-year—and serve on several boards, Ware believes higher fees are necessary to attract and hold their interest.

Outsiders vs. Insiders: Proponents of this view argue that outsiders bring divergent skills and "connections" into an organization. Competent outsiders, for whom there is an increasing demand, they maintain, don't merely come to a meeting and "rubber stamp" decisions.

Others feel that inside directors are more knowledgeable about a company's problems and capabilities and that the effectiveness of outsiders may be diluted, particularly if they serve on many other boards.

Changing Scene: Management philosophy concerning directors may change as a company grows or changes course, Hans Stauffer, president of Stauffer Chemical Co., observes. "Stauffer's board of directors is a reflection of the company's growth," he says. "The outsiders are specialists in law and finance; four of its insiders became members directly as a result of an important consolidation or acquisition. Although members of the company's present operating management comprise half of the board, all but three have held top management positions at one time."

W. R. Grace & Co.'s president,

Peter Grace, traces this evolution of his company's board: "W. R. Grace & Co. began as a partnership, all partners being members of the Grace family. As the company grew and developed professional management, the partnership was expanded to include senior managers outside the family circle.

"When it was incorporated in 1899, the same men, the partners, became directors. They formed a close-knit group and continued to meet every day. Outside directors were not brought in, since the nature of the business (i.e., Latin-American manufacturing, trading and shipping) was such that there was very little that outside talent could contribute to the knowledge of management.

"When I became president in '45, this situation still prevailed except that we added an outside industrialist to the board. When we embarked on our chemical development program, we entered a field where our inside board felt the need of outside experts in our corporate transition.

"Since then we have brought in outside directors, particularly those with knowledge of the chemical industry and public financing. This trend has continued, and today we have 10 outside directors and five from our own management. This sort of trend must develop in each company according to its own special situation. In our case we feel that in our regular meetings we are getting full benefit of the knowledge of our senior management and our wisdom is being greatly enriched by the talents and capacities of our outside directors. The result has proved both harmonious and rewarding."

Outsiders bring an assortment of skills that may be critically needed in smaller companies.

Alco Oil & Chemical Corp. (Philadelphia) believes that specialists in law, finance and marketing are now in greatest demand. But it feels that at least one outside director should be a skilled administrator. "Whether he is from the same or a widely divergent field does not matter nearly so much as whether he has prowess as an administrator," says Alco President Frank Andruss. "People from other fields excel at disclosing new approaches to our problems, because they have an objectivity that we who deal with these problems, day in and day out, cannot possibly maintain. Similarly, people from other industries help suggest possible areas for diversification for our firm. We like to think of—and use—our board of directors in much the same way that a company might use a good consulting firm."

A cross-section of companies favoring mixed boards includes fine-chemicals maker Reheis Co. (Berkeley Heights, N.J.), soon to increase its board to three inside and three outside directors; American Smelting and Refining Co. (eight inside and nine outside directors); United Nuclear Corp. (whose new president, Walter F. O'Connell, thinks that outside experts are essential in running United Nuclear's "highly specialized operation"); Teknika, Inc. (Hartford, Conn.), which includes Polytechnic Institute of Brooklyn Professor Paul Bruins on its board; General Aniline & Film; FMC Corp.; and Merck & Co.

Inside Straight: Hercules Powder and Standard Oil (New Jersey) have only insiders on their boards. Jersey Standard says a director "can best serve the stockholders when he is a working executive of the company." In '59 a resolution to increase its board membership from 15 to 16 to "allow better opportunity for a nonmanagement candidate's election to the board" was rejected by the firm's directors. They reasoned that full-time directors, devoting their entire efforts to the company's interest, "can deal more effectively with the constant flow of intricate and far-reaching problems" and that "first-hand knowledge of the company's business interests and its organization and personnel, derived from daily association with them, is essential for a director." Jersey Standard directors are elected from the full-time personnel of the company and its affiliates.

Dow Chemical's board, with one exception, is made up of company management and is heavily oriented toward industry and finance. But Dow doesn't disclaim the importance of outside directors, says they would be elected if needed.

Directors' Fees: *CW's* survey discloses that directors of chemical process companies are paid about the same as directors in other industries

A Sampling of CPI Director Plans

Company	Inside or Outside Directors	Term	Fixed Retirement Age	Reimbursement	Pension Plan for Outside Directors
(1)	Both	One Year	Yes	Confidential	No
(2)	Both	One Year	No	$100/Meeting	No
(3)	Inside	One Year	No	Salary	
(4)	Inside	One Year	Yes	Salary	
(5)	Inside	One Year	Yes	Salary	
(6)	Both	One Year	Yes	$20/Meeting	No
(7)	Both	Varies	No	$200/Meeting	No
(8)	Both	One Year	Yes	$200/Meeting	No
(9)	Both	Varies	Yes	$2,400/Year Plus $100/Meeting	No
(10)	Both	——	No	$100/Meeting (outside directors)	No
(11)	Inside	Varies	Yes	Salary	
(12)	Both	One Year	No	$2,400/Year Plus $200/Meeting	No
(13)	Both	One Year	No	None	No
(14)	Both	Varies	No	Varies	No
(15)	Both	One Year	No	$5,000/Year (outside directors)	No
(16)	Both	Varies	Yes	$1,250/Meeting (outside directors)	No

reported in a recent industry-wide National Industrial Conference Board survey. NICB's survey covered 285 U.S. and Canadian manufacturing companies, shows that fees are increasing slightly in keeping with national trends of prices and wages. Paying fees for attending meetings is the most popular form of remuneration to outside directors, NICB finds —180 of the 263 cooperating companies having outside directors pay them a regular meeting fee. These per-meeting fees range from nothing, or a token $10 paid by one respondent, to $1,000. About 45% of the NICB respondents paying fees have set $100 as the rate.

Among respondents to *CW's* survey who permit attribution of data Spencer Chemical pays outside directors $2,400 annually, and all its directors receive $100 for each meeting attended. Commercial Solvents and Allied Chemical each pay $200 per meeting attended. Foster D. Snell pays $20.

Directors' fees range from nothing to a high of $1,250 for each meeting. The major chemical company reporting this top fee states, "Nonofficer directors receive a fee of $1,250 for attendance at each regular or special meeting of the board but not less than $15,000 annually. The salaries paid to those directors who are also officers of the company or of a subsidiary cover all services performed by them, including service as a director."

Retirement Provisions: Age is sometimes a factor in selecting directors and in their compulsory retirement in the chemical process industries, according to the *CW* survey, but retirement plans for outside directors are rare.

One company reports that generally no one over 72 years of age is elected to the board. Another firm fixes the maximum age of eligibility at 70, with the exception of current or former chief executive officers who may serve until 75. Still another states, "The company's established policy with respect to directors' retirement is that directors who are also officers, except present and former presidents, shall retire at age 65. Presidents and outside directors retire at age 68. Present board members, whose average age is approximately 57 years, have an average length of service as directors of more than nine years."

Most companies enforcing retirement do so in terms of a fixed age at which directors must relinquish their posts. Another NICB survey (in May of this year) of 205 U.S. manufacturing firms concluded that age and ability to contribute to the company are the main considerations that limit a director's length of service. About three-fifths of these companies have no formal limits on the tenure of directors and do not encourage changes in board membership. NICB also says there is clear evidence of a trend toward compulsory retirement.

Delicate Subject: Since the board of directors itself must rule on members' tenure, retirement, etc., the subject rates tactful management handling. But IMC's Ware, in plumping for his new program of director compensation, makes it clear that marginal-ability directors are a hazard to any firm.

In a growth enterprise, as decisions grow more complex and investment rise, "it's only smart" to get the most competent board members possible, says Ware. "This means individuals who will address themselves to the challenge of leadership." Top-notch directors, even well-paid outsiders, are apparently in for a long-overdue raise.

Outside Directors Come From Many Fields

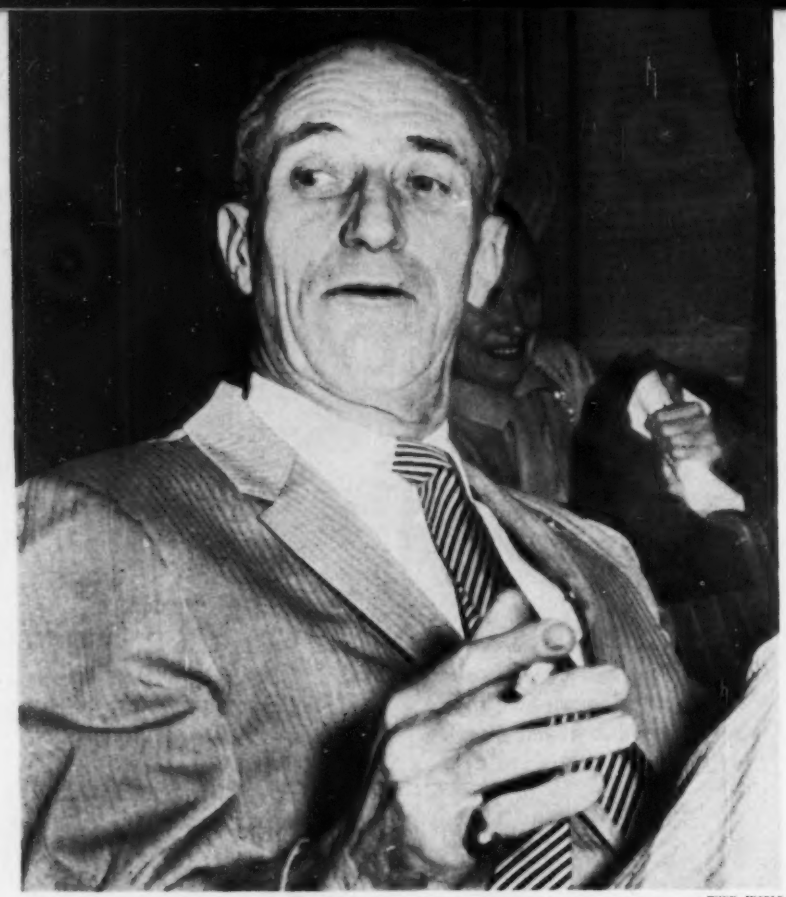
PUBLISHER Bailey Howard is president of Field Enterprises Educational Corp. (Chicago) and GAF director.

PHYSICIAN Chester Keefer, Merck & Co., Inc., director, is a leading authority on infectious diseases.

OIL MAN T. S. Petersen, recently named to the board of FMC Corp., is president of Standard Oil (Calif.).

CW PHOTO—J. SYDLOW

PROFESSOR Paul Bruins, a director of Teknika, Inc., teaches chemical engineering at Brooklyn Polytech.



ILWU's President Harry Bridges: Is it raiding or organizing? WIDE WORLD

Test for Chemical Unions

Whether Harry Bridges' International Longshoremen and Warehousemen's Union will make further moves to organize plants on the Los Angeles-Long Beach waterfront hinges largely on a jurisdictional fight now under way at Vegetable Oil Products Co., Inc. (Wilmington, Calif.).

Oil and chemical companies with waterfront facilities generally regard the fight as a test case, and ILWU admits that it wants to "organize the unorganized and those who are organized but dissatisfied." And that, says George Kuvakas, president of ILWU Local 13, "includes just about everybody."

In an election Sept. 28, VOP workers voted 74 to 65 in favor of Local 13. Loser was International Chemical Workers Union, which had been bargaining agent at VOP for 25 years. It had vigorous support from the company during the election campaign.

However, the election was invalidated by the National Labor Relations Board on Oct. 12 when the chemical union protested that a handbill distributed by ILWU less than 48 hours before the election "in its entirety constitues a willful and deliberate misstatement of material facts."

The bulletin purported to indicate favorable wage scales and working conditions that ILWU had won for its members at Pacific Vegetable Oil Products (Richmond, Calif.). Kuvakas admitted the information was incorrect but blamed it on a clerical error.

Eyeing Others: A new election is expected to be scheduled by NLRB within the next three weeks. Privately, consensus is that ILWU will win again, opening the door to further encroachment on ICWU. In fact, the longshoremen already have made overtures at organizing other workers now represented by ICWU. Among chemical process companies in the Los Angeles-Long Beach area that currently have agreements with ICWU are U.S. Borax & Chemical, Johns-Manville, Turco Products, National Cylinder Gas, and Borden.

Among other firms there that could be affected by an ILWU drive: Dow Chemical, Collier Carbon & Chemical, Kaiser Gypsum, Procter & Gamble, American Potash & Chemical, and McGuire Terminal Co., a large West Coast chemical shipper.

Oil, Chemical & Atomic Workers Union, which has agreements with a number of major oil refiners in the area, is also an avowed main target of the longshoremen.

Behind the Move: According to Kuvakas, the longshoremen want jurisdiction at VOP, where the chemical workers had been solidly entrenched, "because ICWU raided us." He referred to a contract dispute earlier this year by ICWU and Koppel Bros., which operates a bulk grain terminal at Long Beach. Terminal workers had not been organized, but ILWU, which had a contract at another Koppel Bros. plant, charged that its territory had been invaded by ICWU.

Other unions became fair game during the election at VOP. The Maritime Trades Dept. of the Southern California Port Council, consisting of 22 AFL-CIO locals, threw its support to the chemical workers. Only the Teamsters backed ILWU.

In describing the longshoremen's tactics, Kuvakas says, "We don't call it raiding; we call it organizing." He predicts that his local, with current membership of about 3,500, will grow to 10,000 within the decade. And he adds that another ILWU local will soon be chartered specifically to organize offices in the Los Angeles-Long Beach harbor area.

LABOR

New Contracts: FMC Corp. has reached an agreement with the Kemmerer, Wyo., local of United Mine Workers of America, ending an 11-week strike at the firm's pilot coking plant at Kemmerer, which idled 33 union members. The agreement calls for increasing the minimum wage from $2 to $2.30/hour and hiking the maximum scale from $2.80 to $2.95/hour the first year of the two-year pact. During the second year workers will receive an 8¢/hour across-the-board increase.

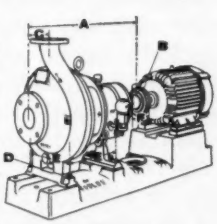
• Best Fertilizer Co. (Lathrop, Calif.) and Oil, Chemical & Atomic Workers Union have agreed on a new, three-year contract, including changes in seniority, shift differentials, and overtime provisions. The firm's em-

Goulds 3195 line gives you 17 different pumps with 6 common dimensions

When you standardize on the Goulds Model 3195, you save time and money in all these ways:

Lower inventories. You need fewer spare pumps or parts because all Model 3195's are interchangeable. All sizes have

- **A.** One over-all length
- **B.** One coupling fit
- **C.** One dimension end of suction to centerline of discharge
- **D.** One bolt size for holding pump to base
- **E.** One bolt spacing for above
- **F.** One spacer coupling length



Wider coverage and flexibility. To meet varying service conditions, you can mount any one of the 17 pump ends to any one of three bearing frames (shafts 1¼", 1¾", and 2⅛" through stuffing box). Nominal impeller diameters of 6", 8", 10", 11", and 13".

Lower installation costs. Continuous installation of many sizes of pumps to the same constant dimensions simplifies installation of both pumps and piping. Four "standard" foundations accommodate all bedplates.

Lower engineering costs. Constant dimensions make pre-engineering of piping and foundations practical. Because complete selection data are available, evaluations and applications are easier.

Lower maintenance costs. Disassembly is simple. One craft can do it without disturbing either suction or discharge pipe connections. Only one gasket joint parting is necessary.

Pumps that handle tough services. The Model 3195 is built to pump corrosives, low-gravity hydrocarbons, slurries and other difficult liquids. It handles capacities to 775 GPM, heads to 425 ft. TDH, and temperatures between −350° and +500° F. Working pressures go to 275 PSIG.

You can get the Model 3195 **off the shelf** in stainless steel, Ductile Iron or Gould-A-Loy. It's also available in any machinable alloy.

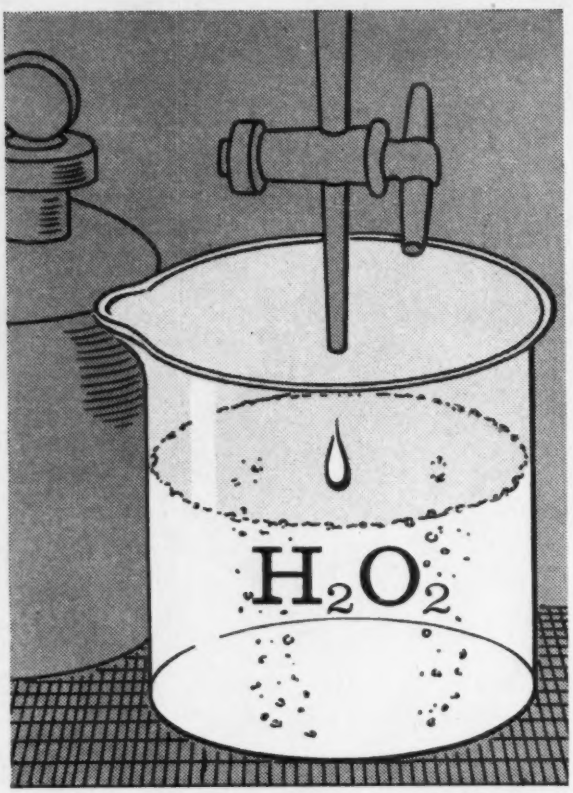
Bulletin 725.1 gives all the details. Just write Goulds Pumps, Inc., Dept. CW-111, Seneca Falls, N. Y.

GOULDS PUMPS

SEE US AT THE CHEM SHOW, BOOTHS 1288 TO 1294

How 3 industries are profiting with Du Pont Peroxides

Is there an idea here for you?



ORGANIC CHEMISTRY

Du Pont "Albone" hydrogen peroxide is being used profitably by the chemical industry for:

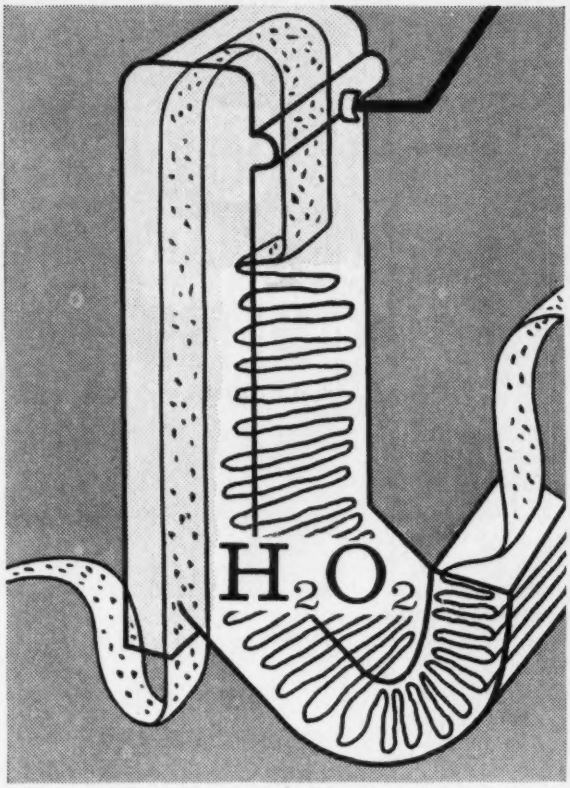
- **Manufacture of epoxidized oils and fatty acid esters for use as stabilizers and plasticizers for polyvinyl chloride resins.**
- **Manufacture of organic peroxides.**
- **Polymerization of unsaturated monomers.**

One major advantage of using "Albone" in organic reactions is that water, a product of the oxidation, is easily removed. This permits the manufacture of products with a high degree of purity . . . less contamination by objectionable by-products.

The oxidizing action of hydrogen peroxide is due principally to the activated state of oxygen in the peroxide molecule. Some organic oxidations require the use of a peracid which is easily prepared from an organic acid and hydrogen peroxide.

Du Pont's new 142-page book, "Hydrogen Peroxide in Organic Chemistry", provides new ideas and describes Du Pont innovations to help research chemists develop new organic chemicals with hydrogen peroxide. For your copy write address at right.

ALBONE® hydrogen peroxide **SOLOZONE**® sodium peroxide **PERDOX**® sodium



TEXTILE FINISHING

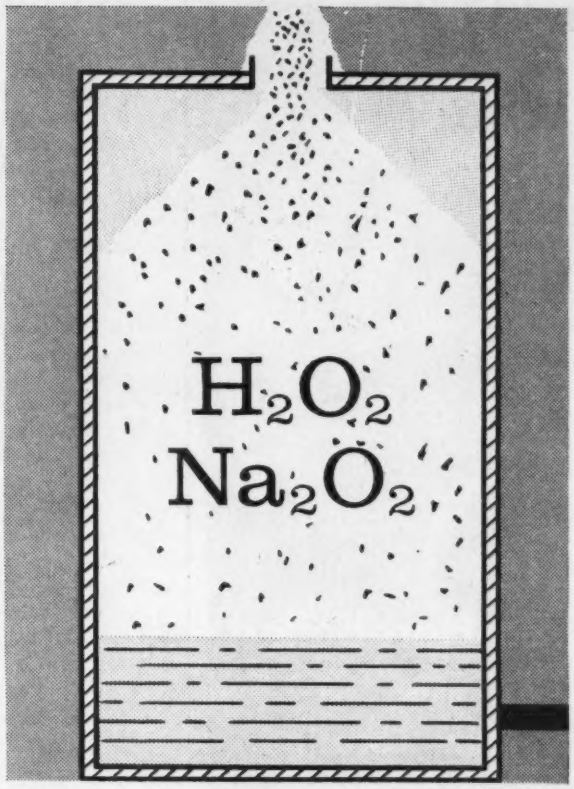
Hydrogen peroxide is used to bleach nearly 90% of all cotton goods because it gives permanent whiteness and color stability with maximum retention of fiber strength.

The textile industry has benefited not only from these advantages of "Albone" but also from its use of these three cost-cutting processes developed by Du Pont:

New Rapid Bleach for medium- to heavy-weight fabrics is adapted to any continuous or semi-continuous open-width system. Advantages: Cuts storage to as low as 8 minutes in each J-box; cuts J-box cost; eliminates rubmarks, bruises and creases; improves dyeing quality of fabrics.

Du Pont Solo-Matic for light- to medium-weight fabrics runs at high speed in rope or open width forms. Advantages: Doubles your production in existing space, or maintains the same production in half the space.

New Pressure Bleach for all types of cotton bleached in kiers or package systems. Advantages: Reduces process time up to 50%; doubles production in existing equipment.



PULP AND PAPER

Du Pont peroxides are being used profitably to bleach groundwoods, sulfite and kraft pulps and new cold soda pulps because they produce high brightness pulp with excellent brightness stability.

Over 95% of all groundwood bleacheries using peroxide have found that the use of hydrogen peroxide and sodium peroxide in combination cuts costs up to $1.25 per ton by eliminating the use of caustic soda. Du Pont manufactures both hydrogen peroxide and sodium peroxide and is experienced in helping mills install effective combination formulas.

Mills bleaching sulfite and kraft pulps are obtaining brightness values up to 90. These peroxide-bleached pulps are premium pulps because they maintain high brightness values during periods of normal shipping and storage.

Many mills, with the help of Du Pont peroxides, are effectively and economically bleaching the new cold soda pulps made from hardwoods. Du Pont's experience can help mills save thousands of dollars by making the right choice between tower and refiner bleaching.

MORE INFORMATION AND TECHNICAL HELP. Perhaps these uses suggest a way in which *you* can profitably use Du Pont peroxides. Call your Du Pont representative . . . he'll be glad to work with you to help develop your ideas into actual uses. Or write for informative literature on Du Pont peroxides: Du Pont, Electrochemicals Department, Wilmington 98, Delaware.

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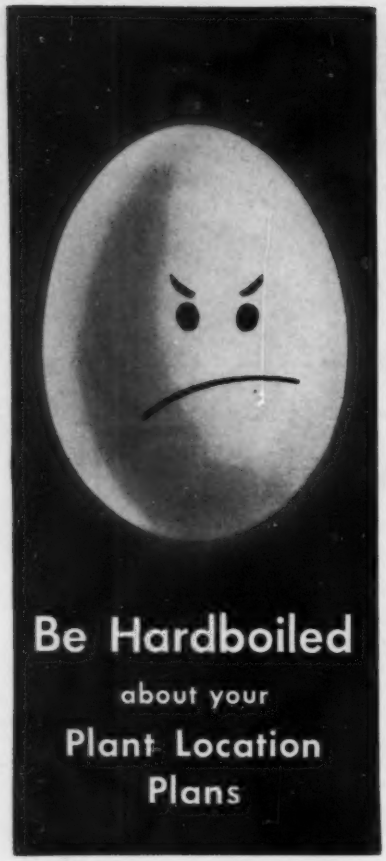

We like to work with hardboiled plant location people. The harder-boiled the better. That's because we can prove the Toledo-Northwestern Ohio area offers unmatched opportunities for Chemical Process Industries. Our proof is contained in a survey of the area by Fantus Research, Inc., one of the nation's foremost industrial location services. For more information, write or call R. E. Johnson, Manager, Industrial Development Department, The Toledo Edison Company, Toledo 1, Ohio

THE TOLEDO EDISON COMPANY
an investor-owned electric light and power company serving Northwestern Ohio

ployees were previously represented by Teamsters Union Local 439 until spring of last year, when OCAW petitioned for a National Labor Relations Board election and won by a wide margin.

• Canadian International Paper Co. and New Brunswick International Paper Co. (Montreal) have signed a two-year labor agreement with unions representing 6,000 mill workers in Quebec, Ontario and New Brunswick. Terms were not disclosed.

• Four locals of Oil, Chemical & Atomic Workers Union have reached agreement with management of the Columbia Gas System on a new, two-year contract covering 1,850 workers in plants in West Virginia, Virginia, Maryland and Kentucky. Contract provisions: an across-the-board wage increase of 9¢/hour from Oct. 1, '61, and an aditional 8¢/hour boost effective Oct. 1. '62; three weeks' vacation after 10 years' service; increased shift differential; changes in holidays, seniority and grievance procedure.

• Representatives of Union Carbide Nuclear Co. (Paducah, Ky.) and officials of Oil, Chemical & Atomic Workers International Union have reached an agreement on a new three-year contract affecting 800-900 workers at the Kentucky plant and several hundred at the K-25 plant at Oak Ridge, Tenn. The contract calls for an 8¢/hour wage boost this year and next with a wage-reopener clause for '63. In describing other provisions of the agreement, a company spokesman states, "The rest was mostly changes in contract language."

•

Organizing Moves: United Steelworkers of America have renewed efforts to organize employees at Tube Turns Division of Chemetron Corp. (Louisville, Ky.). The vote, ordered by the National Labor Relations Board regional office in Cincinnati, will include 631 production and maintenance workers. Last year the same union was defeated as a collective bargaining agent for Tube Turns Division.

• NLRB has submitted a bid to the Cincinnati regional office by the AFL-CIO United Automobile Workers to represent employees of Detrex Chemical Industries, Inc. (Bowling Green, Ky.). The action came after a hearing officer ruled on a dispute over employees eligible to vote on collective bargaining representatives.

exclusive name

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One of the advantages gained in the use of Nevillac, Neville Chemical Company's family of hydroxy resins, is greater control of viscosity in adhesives. Depending upon whether you use Nevillac Hard, Nevillac Soft or Nevillac 10°, you will be able to lower molten viscosity to any reasonable degree.

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TYPICAL PROPERTIES OF SHELL TOLU-SOL THINNERS										
Tolu-Sol	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Distillation °F. (ASTM D-86)										
IBP	199	199	199	199	200	203	204	204	205	205
Dry Point	215	217	220	222	223	227	228	230	230	231
Specific Gravity 60°/60°F.	0.699	0.714	0.721	0.729	0.734	0.747	0.751	0.761	0.769	0.785
Composition, %v										
Paraffins	88	82	77	73	69	64	60	56	51	46
Naphthenes	9	8	8	7	7	6	6	5	5	4
Aromatics	3	10	15	20	24	30	34	39	44	50
Absolute Viscosity centipoise @ 77°F.	0.41	0.41	0.41	0.42	0.42	0.43	0.44	0.44	0.45	0.46
Aniline Cloud Point °F.	148	134	123	114	107	93	86	75	64	55
Nitrocellulose Dilution Power* (ASTM D-1134)	1.22	1.32	1.40	1.49	1.53	1.62	1.68	1.76	1.84	1.92

*Also known as Lacquer Dilution Ratio

Comparison chart shows how range of solvency of Tolu-Sol family widens the choice of diluents for your formulations. *If an intermediate grade is needed, ask Shell to make it for you.* For help in choosing the grade that gives the optimum combination of properties and cost for your formulations, call in your Shell Industrial Products Representative.

BULLETIN:

Shell announces a large new family of Tolu-Sol thinners that allow you to choose the precise solvency you need

From today, the name Tolu-Sol® applies not to one product, but to a complete family of hydrocarbon solvents.

Shell's new Tolu-Sol family is characterized by extremely low naphthene content and closely controlled aromatic content. The family has a wide range of solvent power—but similar volatility. Here are the facts.

Now you can select precisely the right solvency for your needs from a family of thinners with similar volatility but different solvent power. *Shell makes this flexibility possible with its new Tolu-Sol family.*

The composition of these thinners is characterized by a low naphthene content and a closely controlled aromatic portion. Within the family, the aromatic content varies from less than 5 per cent to about 50 per cent.

How to identify each grade

The percentage of aromatics identifies the grade of Tolu-Sol. Thus, Tolu-Sol 10 contains approximately 10 per cent aromatics. Tolu-Sol 50 has approximately 50 per cent aromatics.

The Tolu-Sol you have known for years is now called Tolu-Sol 25.

TOLU-SOL BULLETIN (CONT.)

And it now has a higher aromatic content and better odor.

To develop this new family of solvents, Shell scientists adopted a manufacturing technique that gives more precise control over the composition of each of the Tolu-Sol grades.

Controlled composition

The naphthene content is kept low, because naphthenes, despite their high KB numbers, have relatively poor viscosity reducing power. However, aromatics have high solvency and good viscosity reducing power.

Shell carefully controls the proportions of aromatics in each grade of Tolu-Sol.

Aniline cloud points and lacquer dilution ratios show that the Tolu-Sol diluents will provide the solvency you expect.

Scientist in Shell Laboratory measures lacquer dilution ratios of Tolu-Sol. Ratios range from 1.22 to 1.92.

Greater uniformity

The Shell manufacturing technique produces thinners with dependable properties.

This new Tolu-Sol family can give you greater flexibility in establishing your own formulations.

Here, Shell discusses four important features of the new Tolu-Sol family.

1. *Compatibility.* The full family of Tolu-Sol thinners covers a wide range of solvencies (see chart). Aniline cloud points range from 148°F. to 55°F. and lacquer dilution ratios range from 1.22 to 1.92.

Range of solvencies of new Tolu-Sol family covers wide range of formulation requirements. Example: Low-aromatic Tolu-Sol 10 is ideal thinner for traffic paints and rubber cements.

2. *Volatility.* The Tolu-Sol family has similar volatility with only small differences in evaporation rates.

3. *Viscosity.* All grades of Tolu-Sol have an unusually low naphthene content. *Because of this, Tolu-Sol thinners have very low viscosities for their respective solvency ranges.*

Their lower solvent viscosities can lead to lower finished solution viscosities. Or, at the option of the user, higher solids content with the same finished solution viscosities may be possible.

4. *Odor.* Because they are so highly refined, Tolu-Sol thinners have exceptionally low bulk odor and residual odor.

Wide distribution

Shell's new Tolu-Sol family is *available now* for delivery to all areas east of the Rockies.

Memo to West Coast formulators

New family of Tolu-Sol diluents is not yet available on the West Coast. There, Tolu-Sol W will retain the dependable properties you are accustomed to.

For complete information on Shell Tolu-Sol thinners, see your Shell Industrial Products Representative. Or mail the coupon below.

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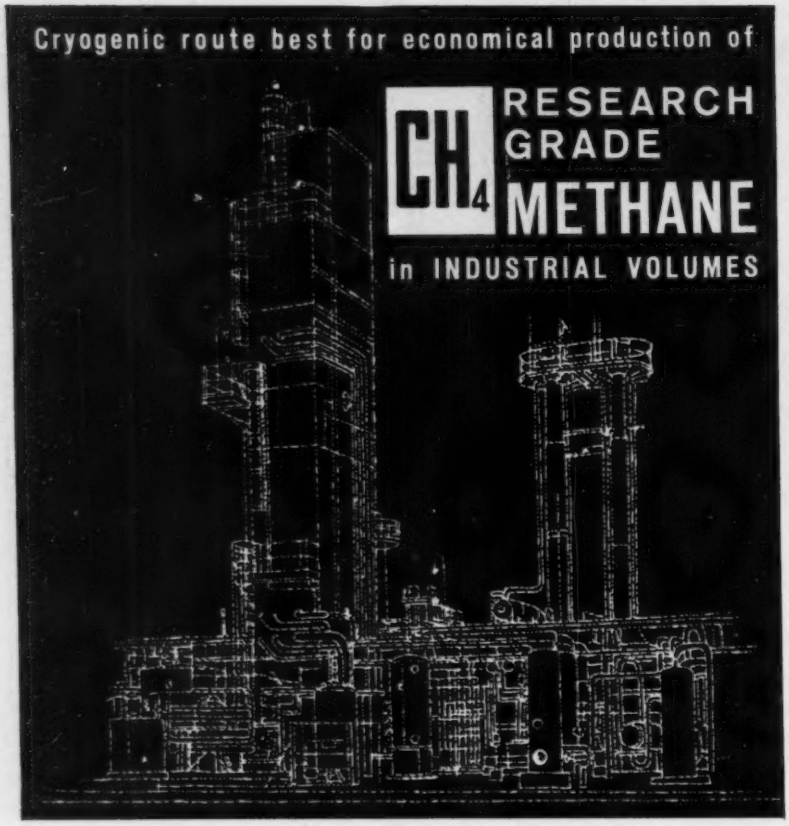

Low-temperature techniques have proved to be the modern route to greater economies and general all-round process efficiency in the recovery and purification of numerous gases. Methane is a typical example.

Impurities in the feed gas are first localized and removed at a single point in the process. This is followed by low-temperature separation of the Methane, resulting in a product of the highest possible purity.

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Custom design is our specialty. Write or call if you plan increases or modifications in your plant, whether for Methane or other gaseous products —Air Liquide Cryotechniques may provide the answer to your problems.

For further information on Methane production, write for Bulletin CH4-1M-61-3.

Thousands of Air Liquide plants of every type are in use throughout world industry. Here are some of them:

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- Coke-Oven Gas Separation
- Refinery Gas Separation
- Methane Purification
- Natural Gas Liquefaction
- Pure CO Production
- Heavy Water—for Atomic Reactors
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ADMINISTRATION

KEY CHANGES

Edward W. Kirchner to vice-president and a director, Lunn Laminates, Inc. (Huntington Station, L.I., N.Y.), molder of reinforced plastic products.

Samuel Efron to executive vice-president, Parsons & Whittemore, Inc. (New York), planner and builder of pulp and paper mills.

Philip B. Taylor to board of directors, The Marquardt Corp. (Van Nuys, Calif.).

Peter N. Lensi to vice-president, Hummel Chemical Co., Inc. (New York).

C. F. Grafton to vice-president, Wood Treating Chemicals Co. (St. Louis).

T. S. Petersen to the board of directors, FMC Corp. (San Jose, Calif.).

Peter Black and **Arthur W. Gilbart** to vice-presidents, **Wilmer H. Kingsford** to an assistant vice-president, Freeport Sulphur Co. (New York).

Charles H. Atwood and **F. Perry Wilson** to vice-presidents, Union Carbide International Co., Union Carbide Corp. (New York).

Dan M. Krausse to vice-president, Dresser Industries, Inc. (Dallas), oil and gas drilling equipment and services company.

Theodore H. Maiman to vice-president, Quantatron, Inc. (Santa Monica, Calif.), applied science company.

W. J. Klauss to chairman of the board of directors, **Bernard J. Hardy** to president, **Paul Gregg** to vice-president, Green Light Co. (San Antonio, Tex.), manufacturer of insecticides, fungicides and specialty plant foods.

Arthur W. Lucas to vice-president, Monsanto Chemical Co. (New York).

Walter L. Petersen, Jr., to secretary-treasurer and a director, Ralph V. Rulon, Inc. (Philadelphia), specializing in chemical-resistant construction.

M. Stuart Roesler to vice-president and treasurer, Kawecki Chemical Co. (Boyertown, Pa.), producer of rare metals and chemicals.

Gordon C. Walker to vice president for finance, **Wallace G. Taylor** to treasurer, **Donald M. Benjamin** to controller, American Cyanamid Co.

THE SOLVENTS AND CHEMICALS GROUP

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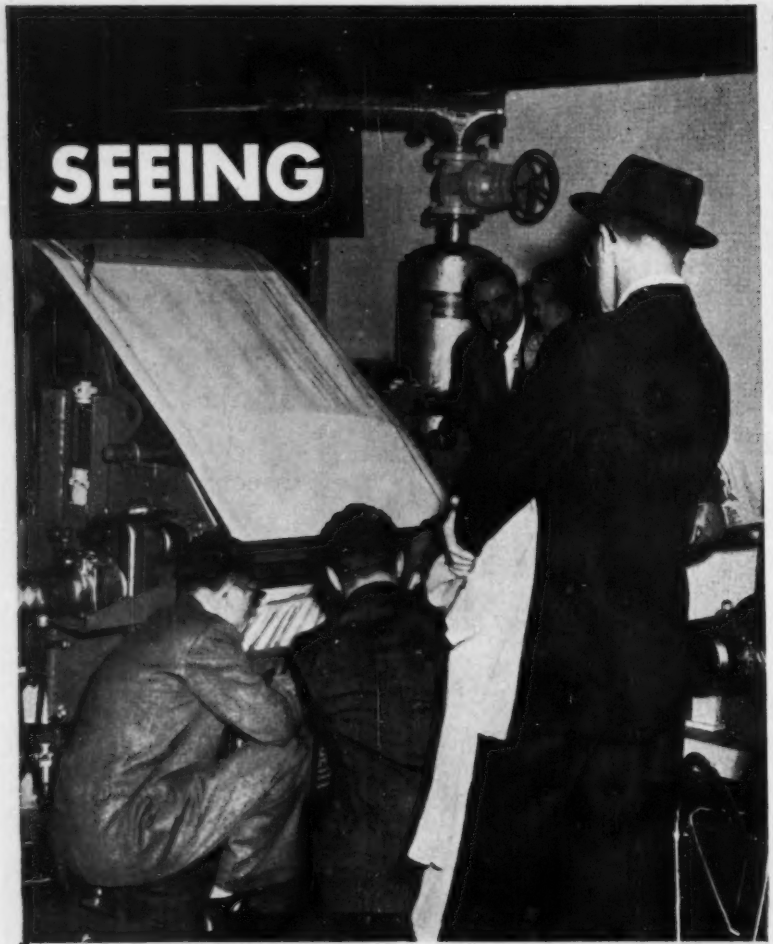

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N. Y. Coliseum, Nov. 27—Dec. 1, 1961

MANAGEMENT: International Exposition Company, 480 Lexington Ave., N. Y. 17, N. Y.

ADMINISTRATION

T. G. Hughes to vice-president of marketing, California Chemical Co., subsidiary of Standard Oil Co. of California (San Francisco); **T. M. Welton** to president, California Chemical's Oronite Division; **H. B. Pollock** to vice-president, Oronite.

Sam Webb, Jr., to vice-president, **H. T. McBride** to treasurer, Atlantic Cement Co., Inc. (New York).

Robert B. Swope and **Robert P. McMillan** to the board of directors, Air Products and Chemicals, Inc. (Allentown, Pa.).

James M. Blakely to vice-president of engineering and operations, Sonic Development Corp. of America (New York), producer of fluid systems and sonic devices.

Edward P. Anderson and **H. Robert Marschalk** to the board of directors, Richardson-Merrell, Inc. (Wilmington, Del.).

Charles E. Bonine to president, **Paul E. Cundey** to treasurer, J. P. Frank Chemical & Plastic Corp. (New York).

Stephen T. Herr to executive vice-president and general manager, United Electric Controls Co. (Watertown, Mass.).

Robert E. Hugus to vice-president, Davidson Rubber Co. (Dover, New Hampshire), manufacturer of urethane products.

James L. Jenks, Jr., and **Erskine N. White** to the board of directors, Hewlett-Packard Co. (Palo Alto, Calif.), manufacturer of laboratory instruments.

Michael F. Hazel to president, Oil Well Supply Division (Dallas), U.S. Steel Corp. (New York).

Robert F. Hurt to president and member of the board of directors; **G. R. Makepeace** to the board of directors, Grand Central Rocket Co. (Redlands, Calif.).

Milton Nowak to vice-president (research and production), Troy Chemical Co. (Newark, N.J.).

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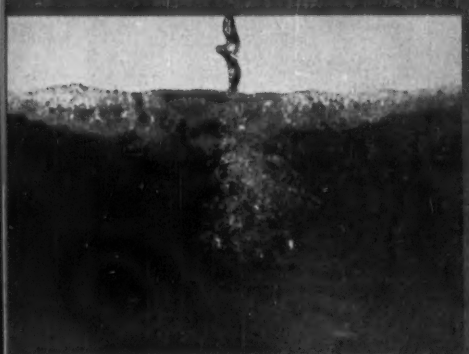
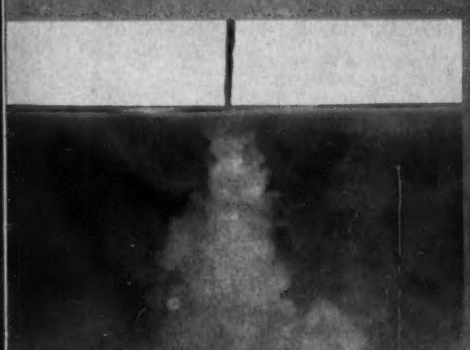
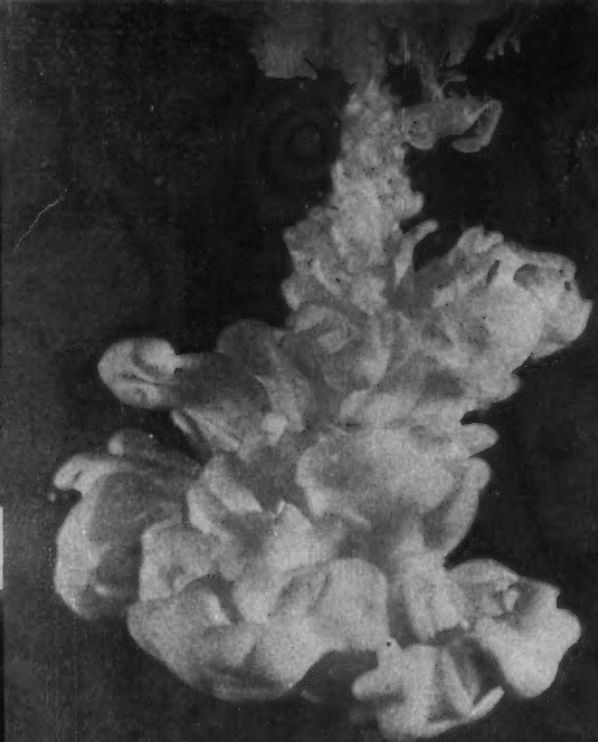


1 Two immiscible phases separate immediately when a hydrocarbon solvent containing no emulsifier is poured into water.



2 The same solvent containing 3% of a poorly balanced blend of anionic-nonionic emulsifiers forms only a fair emulsion in water.



3 The spontaneous "bloom" of a good emulsion dispersing in water results from the perfect balance of an Emcol emulsifier at the same 3% concentration.

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NEWS FROM GOODRICH-GULF

5 AMERIPOL POLYMERS NOW AVAILABLE IN CRUMB FORM

Ameripol 1511, a cold polymerized type, is now available in crumb form. Including the hot polymerized types Ameripol 1006, 1009, 1012, and 1013, this now makes five polymers available both in bale or crumb form.

Crumb rubber is not compressed; thus retains the porous nature of the rubber particles as they are coagulated. The crumbs can be dissolved very easily in a suitable solvent since the solution speed is directly proportional to the amount of exposed area. In making products such as cement, where the rubber must be put into solution, use of crumb rubber saves considerable time and expense.

Ameripol crumb type polymers eliminate the need for milling and cutting or pelletizing equipment as part of a solution process. A simple agitated vessel can be used for dissolving the rubber. Packaging of the material is in rectangular cartons holding approximately 60 pounds.

Ameripol
THE PREFERRED RUBBER

TWO NEW AMERIPOL MICRO-BLACKS REDUCE FABRICATION COSTS

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Both types are highly oil-extended; thus offering a lower per-pound cost to the fabricator. Yet physical properties are very attractive as a result of the extremely fine dispersion exclusive with Ameripol MICRO-BLACK. Both masterbatches are suitable for products requiring good abrasion resistance.

TYPICAL PHYSICAL PROPERTIES

(Based on test recipe of 150.5 parts masterbatch, 1.5 parts zinc oxide, 2.0 parts sulfur, 1.0 parts Benzothiazyldisulfide. Cure at 293°F.)

	Minutes Cured @293°F	Ameripol 4758	Ameripol 4772
Tensile, psi	50	3030	2980
Elongation, %	50	660	710
Modulus, 300%, psi	25	630	640
	50	1060	1050
	100	1380	1320
Hardness, Shore A	50	69	58
Compounded viscosity, ML4 @212°F		52	52

ACCENT ON SERVICE SPEEDS BUTADIENE SHIPMENTS

These new barges, operated by Goodrich-Gulf on inland waterways, are believed to be the first designed specifically for butadiene service. Goodrich-Gulf has previously shipped butadiene by ocean barge to overseas customers.

This new transportation system will substantially improve service to butadiene customers in the Midwest. Leased storage facilities will increase inventory available to users.

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Speed Is Sleuth in New Testers

Last week at a symposium on high-speed testing (HST) the status of this novel product development technique was clearly delineated to about 150 chemical process company representatives: HST has proved its value in research on rubber, textiles, solid propellants and metals—but it's now clear that its full acceptance hinges on the development of standardized testing methods and improved data interpretation.

HST can claim sizable strides in industry—in the past three years, at least 20 HST machines have been sold; before '58 only seven had been bought from instrument makers (*CW, Dec. 27, '58, p. 76*), although some "home-made" machines were in use.

Availability of stock models has helped acceptance. Both Plas-Tech Engineering Corp. (Natick, Mass.), which sponsored the third annual symposium last week at Boston, and Allegany Instrument Co. (Cumberland, Md.) offer such units (*see chart*) —but the custom unit is still strong in much HST work and will likely continue—for a while, at least.

Fabric Research Laboratories, Inc. (Dedham, Mass.), and Celanese Corp. of America (New York), for example, have just completed a new custom tester for single fibers. It's now being used at very low loads—e.g., up to 10 grams, although it is capable of much higher loads (*CW Technology Newsletter, Oct. 14.*). The machine has a speed range of 3,600-36,000 in./-minute, provided by a nitrogen-driven piston.

Basic Advantage: Behind development of this unit—and behind the growth in HST—is the fact that most fibers, polymers, metals and other materials do not have the same properties under slow (static) application of stress and under swift (dynamic) application. Most researchers are aware that the stiffness of plastics can vary greatly (by a factor of 1,000) as the speed of applying a force increases from the conventional 20 in./minute to 20,000 in./minute. For years, however, little research use was made of this.

Before the advent of modern HST equipment, materials were often tested as final products under empirical conditions. Later, certain high-speed equipment—e.g., pendulum and drop testers—was developed to simulate actual conditions. Now, still more advanced equipment has been developed on a home-made basis, and this is supplemented by fairly sophisticated stock models. All this is helping researchers interpret and develop basic HST standards.

This search for standards is intensifying. Gordon Patterson of Du Pont's Film Dept. and Reed Smith of U. S. Rubber's Naugatuck Chemical Division presented a paper at last week's symposium describing HST work in American Society of Testing Materials (ASTM) committee D-20 on plastics. This committee is evaluating work on pneumatic, hydraulic, rotating wheel and smokeless-powder HST equipment. Object: to standardize equipment specifications, speed ranges and test methods used to determine the tensile stress behavior of plastics. Patterson and Smith are not alone on this project: Plas-Tech, Union Carbide, Columbian Carbon, Monsanto and the U.S. Army's Picatinny and Redstone Arsenals are also participating in it.

Available Equipment: Aside from the variations in power sources for the testers (*see Dimension, p. 86*), there is a considerable difference in the speed and operating features of the different units.

Plas-Tech President Melvin Silberberg reports that his firm's hydraulic unit features closed-loop servocontrol, which insures continually adjustable rates of loading or straining—from static to dynamic speed ranges (8,000 in./minute). Two other machines offered by the firm bring its range of high-speed testing capability all the way up to 200,000 in./minute. One is air operated; the other is a smokeless-powder machine.

According to Allegany Instrument's Robert Shelley, his firm also has been concentrating on hydraulic HST equipment—it has been in the field about seven years. But the company has chosen to concentrate in the lower

Filling the High-Speed Testing Spectrum

Type	Hydraulic	Hydraulic, Pneumatic, Explosive (smokeless powder)	Pneumatic	Ballistic	Flywheel	Gravity (pendulum, drop)
Manufacturer	Allegany Instrument Co.	Plas-Tech Equipment Corp.	Fabric Research Laboratories, Inc. (developed for Celanese Corp.)	FRL and other firms	Experimental models made by various users	Testing Machines, Inc.; others
Loading rate (in./minute)*	20-10,000	6-200,000	3,600-36,000	Over 1 million	7,000-70,000**	4-33,000
Maximum load (lbs.)	5,000	10,000	10,000	10,000 (in experiments at FRL)	50**	To 500
Cost	$20-25,000	$10-40,000	(sold on custom basis only)	Not sold	Not sold	To $5,000

*The Marquardt Corp. sells a 20-in./minute hydraulic machine; Instron Engineering Corp. offers a gear-operated unit with the same maximum speed. **American Enka machine.

ranges of speed—up to 10,000 in./-minute.

In the still-lower loading-speed ranges is equipment from such firms as Marquardt Corp. (Van Nuys, Calif.) and Testing Machines Inc. (Mineola, N.Y.) and Instron Engineering Corp. (Canton, Mass.). Instron, a major producer of physical test equipment for many years, offers a line of low-speed testers (0.002-20 in./minute; $5-13,-000). This firm has no definite plans to enter the high-speed field, probably feels that researchers are still learning how to use the high-speed data and that the various machine concepts have not been narrowed down to the most useful ones.

The Home-Made Field: Researchers' need for familiarity with HST data is one reason why a good portion of the Boston symposium concerned noncommercial equipment. This emphasis is especially noteworthy since symposium sponsor Plas-Tech does its entire business in equipment and contract research for HST.

C. S. Kemic of American Enka Corp. (New York) gave details on use and data provided by his company's novel flywheel impact tester. This gives, he says, a speed range of 7,000-70,000 in./minute. It is being used to evaluate how automobile tire cords react when they hit a 6-in. road curb at normal speeds. Data was taken on the breaking energy, elongation, time-to-break and tensile strength of rayon, nylon, other tire-cord materials.

Like many other firms, American Enka developed its flywheel tester before commercial high-speed testing machines became available—in '55. Kemic says that if he needed additional equipment now he would have to consider the commercial field — even though his machine is working well.

FRL developed a ballistic system for determining the impact behavior of high-strength parachute components (*CW Technology Newsletter, Oct. 29, '60*). And the firm has used a variety of commercial and proprietary equipment in evaluating stress-strain properties of isotactic polypropylene for the Army's Quartermaster Corps. FRL's policy is to sell machines on a custom basis—usually in conjunction with research work, as in the case with Celanese.

Roy Laibel of the Quartermaster Corps presented a paper on the Corps' work with two other home-made machines—one built by the National Bureau of Standards and one by MIT. And Du Pont researchers have made at least five different high-speed testers, among them a pneumatic unit for polymer tests and a smokeless-powder machine for solid-propellant studies. As is often the case, home-made units were built when commercial units didn't quite fill the bill.

Also discussing its own devices was B. F. Goodrich Co., which uses high-speed equipment to measure strength and elongation of rubbery materials. Test rates: 5,000-33,000 in./minute. Goodrich's system is a form of gravity drop in which a weight falls from a magnetic grip. The weight stretches the test sample, and the tensile load is measured on a strain gauge and displayed on an oscilloscope.

Hot and Fast: In the field of metals and alloys, Warren Savage and Ernest Nippes, professors at Rensselaer Polytechnic Institute (Troy, N.Y.), are using an unusual high-speed tester they developed. Specifically designed for studies of short-term high-temperature properties, it features a system that rapidly heats specimens to high temperatures by resistance heating. Then, at speeds up to 1,200 in./-minute, loads up to 10,000 lbs. can be applied. Savage says that patents on accessory instrumentation that will permit direct measurement of strain have been applied for.

For solid-propellant studies, Grand Central Rocket Co. (Redlands, Calif.) originally developed its own procedures. This company, however, recently switched to a Plas-Tech unit.

The Outlook: Modern HST has passed the initial acceptance stage. Esso, Thiokol, Columbian Carbon, Borg-Warner and Aerojet are among the chemical companies using commercial equipment, and the response at last week's meeting indicates others will try it soon.

Such newcomers will have a fair variety of high-speed equipment to choose from.

DIMENSION

What Puts the Push in High-Speed Testing Machines?

Pneumatic machines have gas-driven pistons that provide the sample-breaking force. Compressed gas is let in one side of the piston and a partial vacuum is created on the other side. The pressure differential shoots the piston through the cylinder. Operating this system is relatively inexpensive, but it has a drawback: speed of the piston varies as it moves down the cylinder, a change due to a variance in gas pressure over the stroke.

Hydraulic machines are similar to pneumatics, although a liquid instead of compressed gas is used to move the piston. Since liquids are essentially noncompressible, this system applies a constant force to the sample, and this force can be accurately controlled. Design—fast operating valves, etc.—is critical, otherwise some of the available force would be dissipated and not applied to the sample.

Smokeless-powder or explosive systems rely on rapid production of combustion gases in a cylinder. Nitrocellulose is widely used; such units by-pass the valve problems sometimes associated with hydraulic systems. High testing speeds (load speed) can be developed, but the system suffers from relatively poor control.

Ballistic systems — in which a "free" projectile is fired at a fixed test sample—have succeeded in attaining extremely high testing speeds. Gas-fired cannons and 22-caliber rifles have been used to propel a variety of projectiles. The load on the sample is regulated by varying the pressure and the size of the bullet. Although these systems are difficult to control, they are about the only way ultrahigh load speeds can be obtained.

Rotary or flywheel systems are based upon a spinning wheel that slams a weight on its rim into the sample. The problem lies in converting rotary motion into even linear action.

Gravity systems rely on a dropped or swung weight (devices range from a unit weighing several tons, used to test parachute cords, to gram-load pendulums) to provide the breaking strain. The pendulum devices are now in quite general use for low-speed testing.

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Wash-Wear Hopefuls

Two new wash-wear finishing systems are bidding for expanded commercial use this week. One is a formaldehyde cross-linking technique developed by the Dept. of Agriculture; the other, a sulfone treatment now offered for licensing by J. P. Stevens & Co. (New York).

The USDA process—called Form-D for its dry-wrinkle-recovery effectiveness (*CW, Sept. 23, p. 47*)—has been found feasible for commercial application in plant-scale experiments by four firms, one of which is test marketing the treated fabric. The new finish is said to be more durable than many of those now in use, and it is not susceptible to deterioration by chlorine-containing bleach. However, application takes longer and costs more. Fabric strength loss is said to be in the same range as currently used finishes, unlike earlier formaldehyde treatments that severely weakened the fabric.

Key is in controlling the amount of swelling of the cotton fiber prior to formaldehyde treatment. Water swells the fiber, while acetic acid or calcium chloride is used to control the amount of swelling. Cross-linking is catalyzed with hydrochloric acid.

The sulfone licensing offer by Stevens covers a process for cross-linking cellulosic fibers with vinyl sulfones covered by U.S. Patent 2,524,399 (acquired from U.S. Rubber Co. a few years ago).

This treatment, although using relatively costly chemicals, has been applied commercially by Stevens and by a few temporary licensees since early this year. Exceptionally high permanency and lack of chlorine retention are cited as advantages that have led the company to offer the process for general use.

Polymer Services

The finishing touches are being put on new research facilities of Gaylord Associates, Inc. (Newark, N.J.). The company, recently launched by Norman Gaylord, former research and development vice-president of Western Petrochemical Corp., specializes in patent-producing polymer research for clients, but it also offers a variety of other services.

Now included in the services list are custom synthesis and evaluation. Eventually, the company will offer a bureau of traveling consultants and in-plant polymer courses.

Staffers Set the Schedule: Key to the operation of the firm is a somewhat unusual staffing plan—many of its researchers are in academic work, too, and Gaylord Associates' working hours are tailored to fit their needs.

Gaylord splits his time between GA, private consulting, and work in polymer literature. This includes the editing of two of Interscience Publishers' worldwide abstracting services *Resins, Rubbers and Plastics,* and *Natural and Synthetic Fibers.* In addition, he is on the editorial board of the *Journal of Applied Polymer Science* and the advisory board of the *Journal of Polymer Science.* (Moreover, he's planning to collaborate with Brooklyn Polytechnic Institute's Herman Mark on an encyclopedia of polymers and plastics.)

Gaylord Associates moved to its present address (20 Mt. Pleasant Ave.) in April, expanded to 6,000 sq.ft. in July. The firm has signed up with seven CPI companies now, including contracts with Allied Chemical and Cabot Corp.

PRODUCTS

Gold Spheres: A new high-vacuum forming process for gold, gold-gallium and selected gold alloy spheres has been developed by Semi-Alloys, Inc. (Mount Vernon, N.Y.). The spheres can now be processed in sizes down to 0.0005-in. diameter at purities of 99.999%.

•

Formic Acid: Benzoyl formic acid (phenyl glyoxylic acid) and methyl benzoyl formate are now available in development quantities from S. B. Penick & Co. (New York).

•

Solid Support: Applied Science Laboratories, Inc. (State College, Pa.), now offers a new solid support for preparation of column packings for gas chromatographs. Called Gas-Chrom Cl, it is prepared from Johns Manville's Celite by controlled screening to remove fines.

•

Crystals: Gulton Industries, Inc. (Metuchen, N.J.), is now offering 22 types of ionic crystals, including maser and laser materials.

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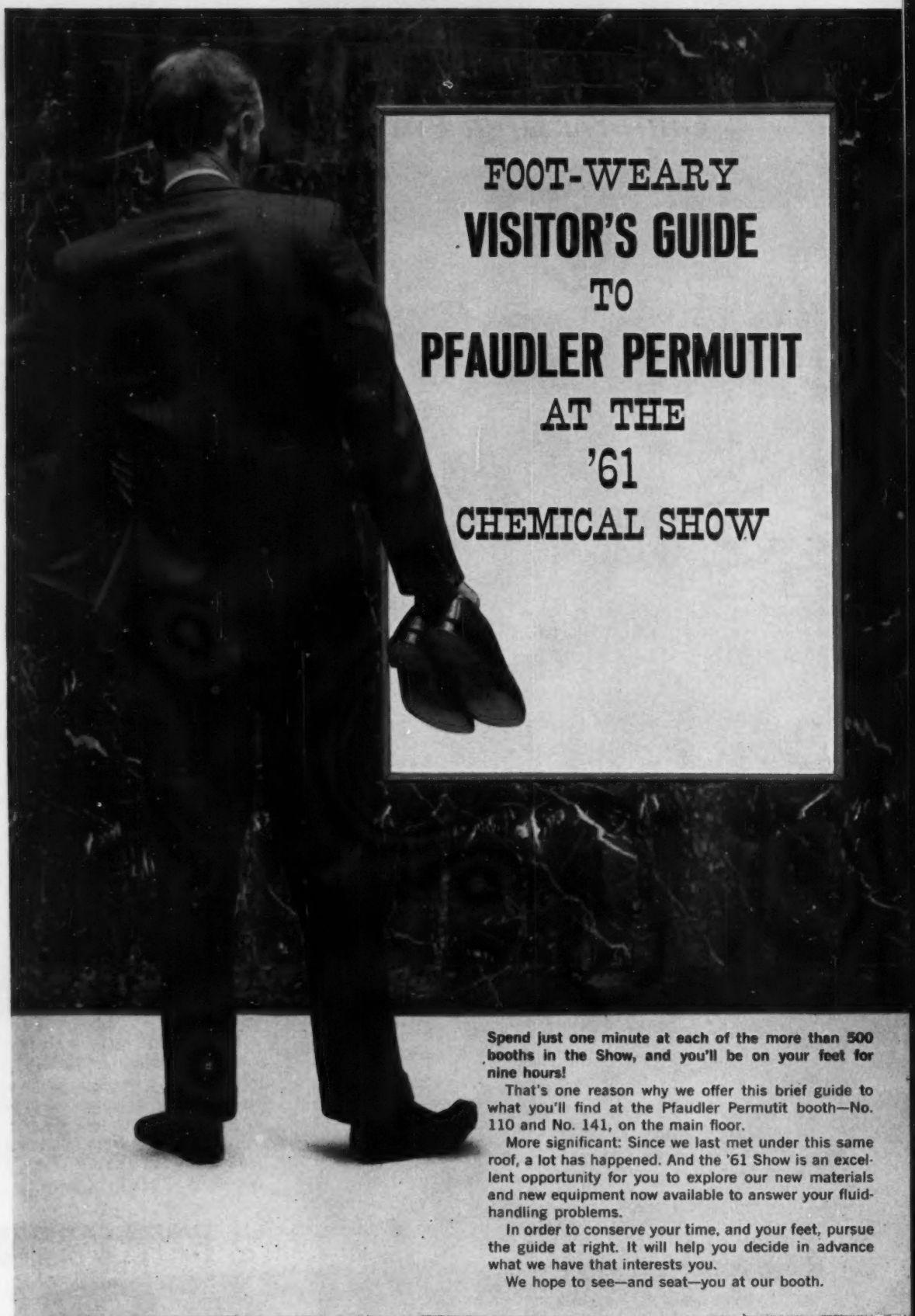

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Spend just one minute at each of the more than 500 booths in the Show, and you'll be on your feet for nine hours!

That's one reason why we offer this brief guide to what you'll find at the Pfaudler Permutit booth—No. 110 and No. 141, on the main floor.

More significant: Since we last met under this same roof, a lot has happened. And the '61 Show is an excellent opportunity for you to explore our new materials and new equipment now available to answer your fluid-handling problems.

In order to conserve your time, and your feet, pursue the guide at right. It will help you decide in advance what we have that interests you.

We hope to see—and seat—you at our booth.

NEW MATERIALS TO FIGHT CORROSION

MORE EFFICIENT UNIT OPERATIONS

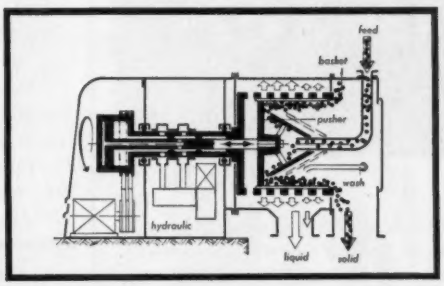
AND OTHER FLUID HANDLING EQUIPMENT

Never before has Pfaudler, or any company, offered such a complete range of corrosion-resistant materials. Start with **Nucerite***. This newly developed family of ceramic-metal composites now makes possible and practical the handling of corrosives at 500°-1500° F. At the show you'll see: (a) 200-gallon Nucerite reactor, (b) Nucerite manhole extension collar, (c) Nucerite immersion heater for acid recovery. Don't forget to ask about our field-test sample program. Of course, you'll want to discuss **Pfaudler Glasteel** TM for all your acid-alkali processing to 350° and higher. You'll see a 500-gallon stock-standard Glasteel reactor in operation.

Next examine the **titanium, tantalum** and **zirconium** process equipment. Be sure to question us on the economics of titanium in chlorine gas cooling. Don't miss the 300-gallon **Pfaudlon® 301** plastic-lined vessel, featuring broad-range corrosion protection to 210°.

Nucerite, Pfaudler's new family of ceramic-metal composites for high-temperature corrosion protection, now offered on vessels to 2000-gallon capacity. Illustrated: Nucerite acid-recovery immersion heater.

New to the chemical industry are the **Krupp filtering centrifuges,** distributed solely by Pfaudler. Two types are offered—continuous Pusher and automatic-batch Peeler with horizontal basket. See the Pusher unit on display. Discuss time and cost savings afforded in dewatering free-draining crystals, salts, starches, and polyolefins. Examine the life-size, full-dimension cutaway model of the **Pfaudler Wiped Film Evaporator,** animated to show product flow. See for yourself how efficiently heat-sensitive and viscous materials are handled in this true wiped-surface evaporator. Next, evaluate firsthand Pfaudler's compact **TW Drive.** A wise choice for your plant-standard drive. Fixed-speed gear, fixed- and variable-speed belt models on display—showing hookups to open and closed vessels. Demonstrate for yourself the flexibility of the variable-speed TW in operation on the Glasteel reactor. Sign up for our new 6-step Agitation HP Calculator.



Krupp Pusher-type centrifuge to be shown for the first time in the U. S. Short-stroke Pusher acting over rotating screen deliquors, washes and discharges crystals continuously with minimum product degradation.

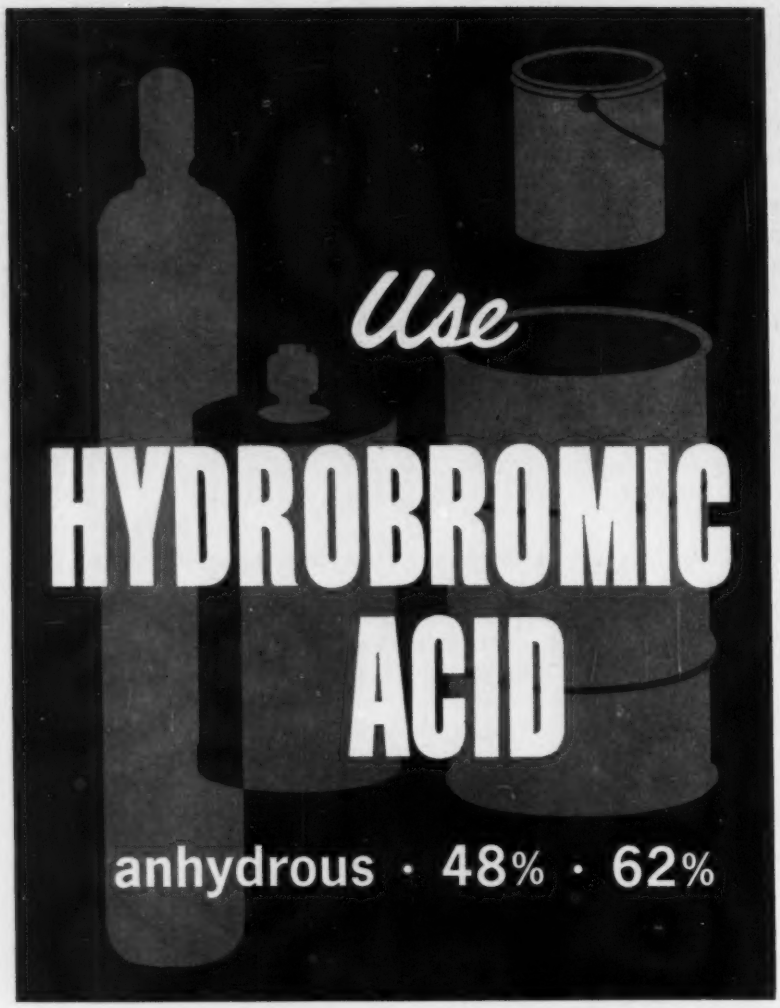
Displays, literature and expert counsel on the following: **F-C* (field-cut) Glasteel Pipe** featuring new line of flanged Glasteel Pipe fittings and inexpensive portable fire-polishing furnace . . . **Teflon envelope gasket** for 500-psi service . . . new **thermowell** with interchangeable tantalum-Glasteel tip . . . and **Project Engineering** services; all to be found in Booths No. 110 and No. 141. Of course, our Permutit Division will be featuring the latest advances in **water- and waste-treatment** equipment. See the **valveless filter** in animated operation; also **precipitators** and **packaged demineralizer** units will be displayed. **OFFER:** For a broad look at how Pfaudler Permutit equipment serves the chemical industry, write for **1962 Buyer's Guide.**

*Patent applied for.

Address your inquiry to our Pfaudler Division, Dept. CW-III, **Rochester 3, New York. In Canada, contact Pfaudler Permutit Canada Ltd., Toronto.**

PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS . . . the science of fluid processes



OFTEN THE BEST WAY...

to react aliphatic alcohols
to react olefins
to cleave ethers
to react epoxides

Select the right strength. Maintain water-free conditions with anhydrous HBr. Choose 48% or 62% acid on the basis of reaction temperature. When the reaction temperature is low, the stronger acid is often favored.

Advantages: The greater ease of preparation and higher reactivity of the aliphatic bromides generally indicate the preference of HBr over other halogen acids. *In fact, the difference in reactivities sometimes is so great that the bromide route must be used.* Our experience in bromine and its derivatives may be helpful to you. Write, wire, or phone us today for information on prices, deliveries, or technical data.

Prompt shipment from convenient warehouses

HBr, anhydrous: 125 lb. net cylinders.
HBr, 48%: 55 gal. drums (625 lbs. net), 13 gal. carboys (150 lbs. net), and 5 gal. non-returnable cans (60 lbs. net).
HBr, 62%: 55 gal. drums (750 lbs. net), and 13 gal. carboys (175 lbs. net).

MICHIGAN CHEMICAL CORPORATION
717 North Bankson Street • Saint Louis, Michigan
Eastern Sales Office: 230 Park Avenue, New York 17, N.Y.

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RESEARCH

EXPANSION

• The Goodyear Tire & Rubber Co. (Akron, O.) has tripled its supply of cobalt-60 (to 11,000 curies) to enable expansion of its radiation research program. Studies to be conducted: radiation vulcanizing of rubber, polymer synthesis using radiation catalysis, development of radiation-resistant materials, and testing of space projects.

• General Electric Co.'s Burlington, Vt., plant is the site of a new laboratory devoted solely to water-desalting process work. The lab will be used to investigate and develop new concepts and to advance the firm's thin-film distillation process.

• Electric Storage Battery Co. and Sun Oil Co. (both of Philadelphia) have agreed to exchange of research information and future development of the fuel cell.

• Molybdenum Corp. of America has renewed its research program at Pennsylvania State University on the individual rare-earth metals. Attention will be centered on cerium, lanthanum, praseodymium, neodymium, gadolinium, europium and samarium.

• Wallace & Tiernan's Lucidol Division has dedicated its new $750,000 research center at Buffalo, N.Y.

• A cooperative agreement for research on organic enzyme fuel cells and organic depolarizers for use in rechargeable electrochemical batteries has been signed by Electro-Optical Systems, Inc. (Pasadena, Calif.), and Sonotone Corp. (Elmsford, N.Y.).

• Thiokol Chemical Corp. has established a new unit for research and development in the life sciences. Areas covered by the new organization, called Humetrics, are behavioral and engineering psychology, training, environmental psychology and bioelectronics. Quarters are being readied in Culver City, Calif.

• After 10 years as a constituent part of the National Academy of Sciences-National Research Council, the Building Research Institute will become an independent, nonprofit technical society during the coming year. Activities and services offered will remain unchanged.

• Ferranti Electric Inc. (Plainview, N.Y.) has recently started operating an expanded rheological laboratory for consulting and testing work.

• Perini Ltd. (Montreal, Que.) will

BRIEFS

caprylyl chloride
butyryl chloride
lauryl mercaptan
lauryl pyridinium chloride

DID YOU KNOW WE MAKE THESE?

Among many chlorinated organics we make are these two chemicals often used in syntheses to introduce the caprylyl or butyryl groups respectively.

Take caprylyl chloride, for example. It reacts with water and alcohol, is miscible with most other common solvents.

Our product has a freezing point of below minus 70°C. and typically contains 21.8% chlorine.

It is reportedly used in emulsifying agents and lubricants.

Then there is our butyryl chloride. A clear, colorless liquid, it reacts with water and alcohol and is infinitely soluble in ether.

It freezes at minus 89°C., boils at 102°C.

Data sheets give you more of the story. Just check and mail us the coupon.

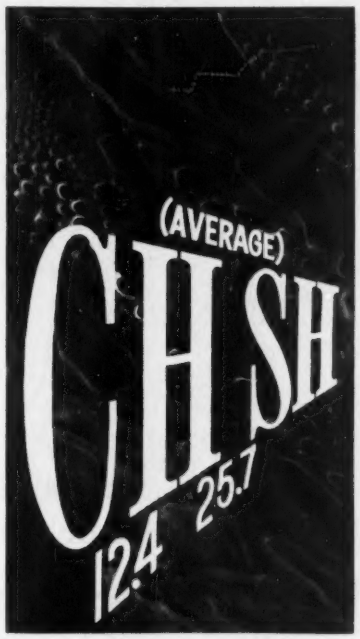
NEED TO MODIFY A POLYMERIZATION?

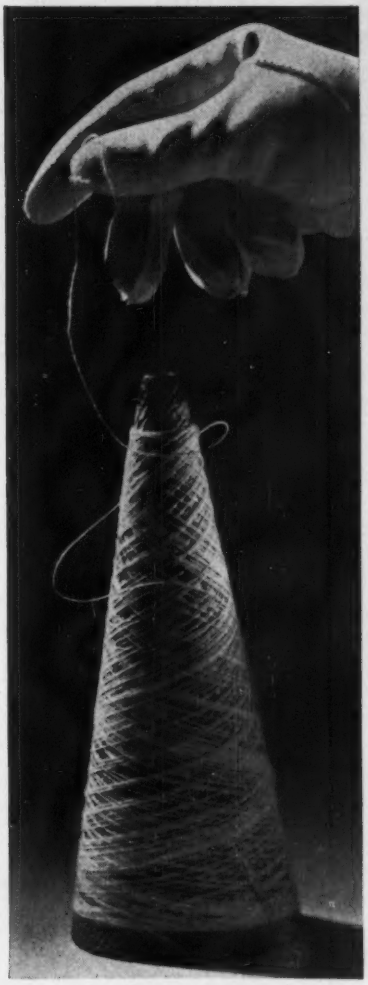
Our lauryl mercaptan may be just the answer you are seeking.

A clear, water-white liquid with a characteristic mild odor, it contains no less than 14.6% mercaptan sulfur, no more than 0.5% chlorine. It is soluble in benzene up to 99.75%.

It more than meets U. S. Rubber Reserve Spec LM 2.5.0-5—and is used in the synthetic-rubber "hot" process as well as other polymerizations.

Our data sheet covers specifications and typical data. It's yours for the asking.





CATIONIC DETERGENT

Hooker lauryl pyridinium chloride, having a minimum assay of 85%, is sold as an unrefined technical material. Like most quaternary ammonium compounds, it has potent bactericidal properties. But its primary use is as a cationic agent in viscose rayon production, to prevent clogging of spinneret orifices. Other possible applications: dispersing and wetting agent, stripping agent for vat and other dyes, intermediate in manufacture of foam-resistant compounds, leveling agent in polishes and waxes. Write for data sheet.

For more information, check here and mail with name, title, and company address.

☐ Caprylyl chloride ☐ Butyryl chloride ☐ Lauryl mercaptan
☐ Lauryl pyridinium chloride

For the complete line of Hooker chemicals, see Chemical Materials Catalog or Chemical Week Buyers' Guide.

HOOKER CHEMICAL CORPORATION
711-1 Forty-seventh Street, Niagara Falls, New York

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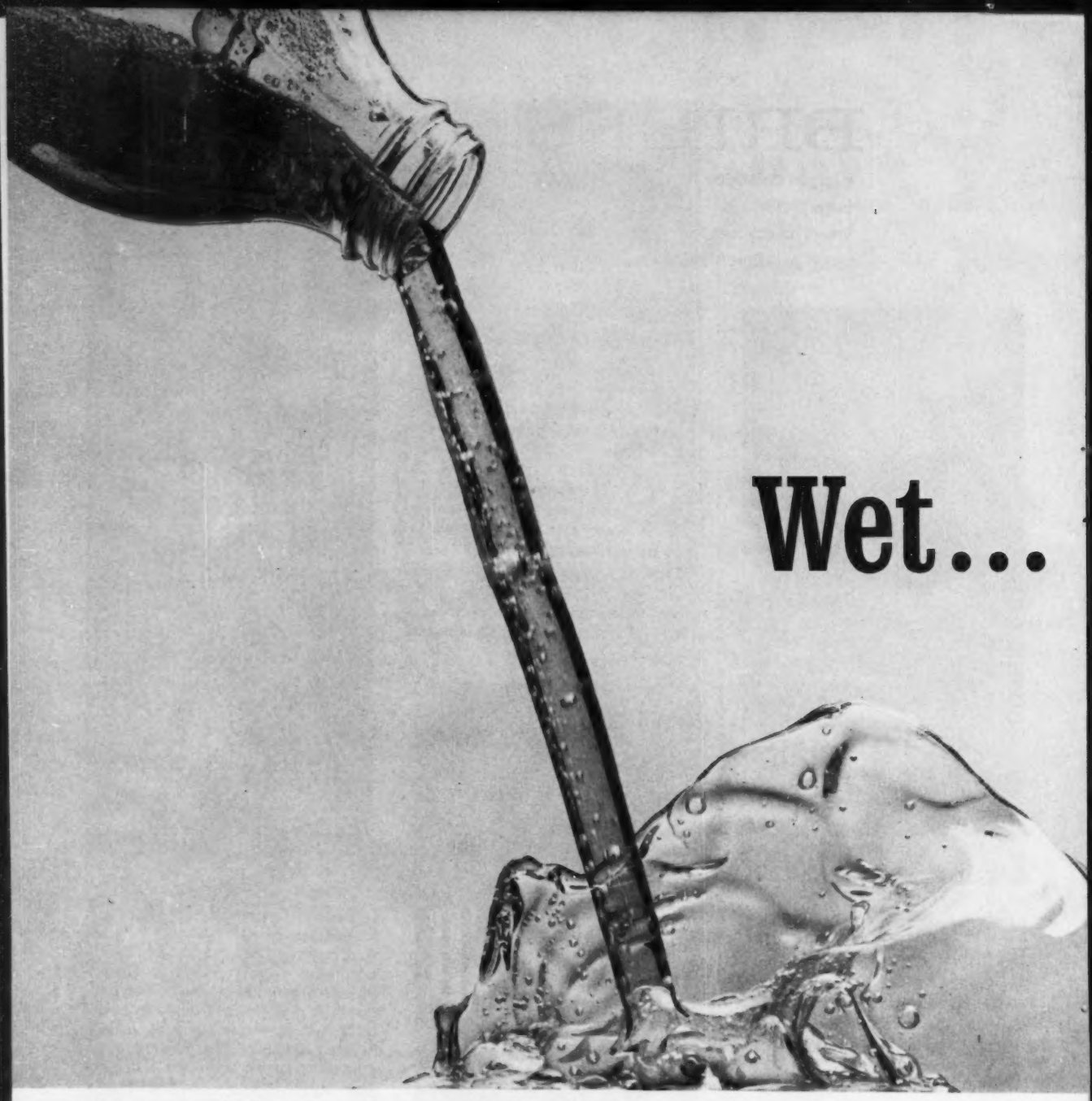
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER CHEMICALS PLASTICS

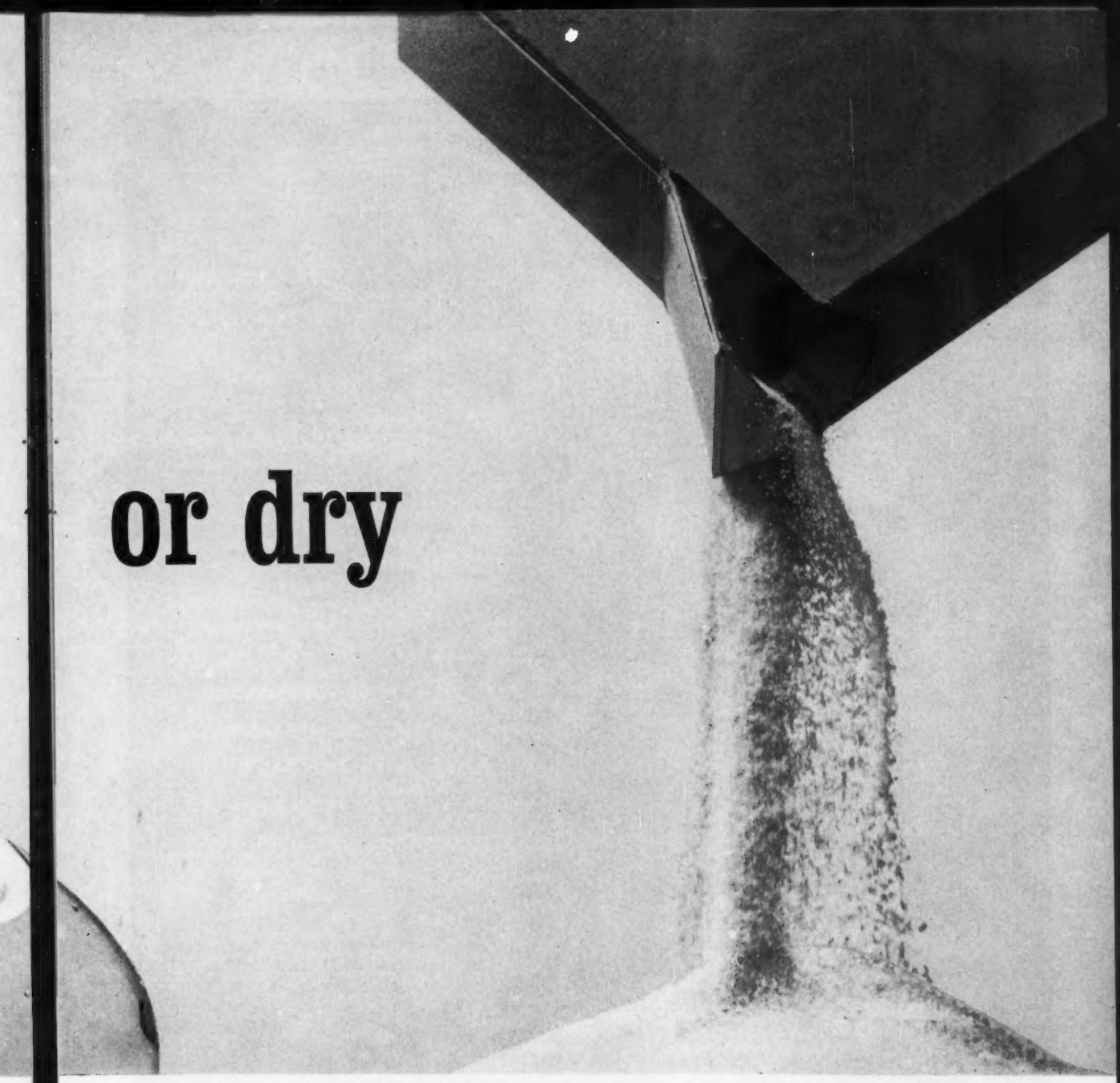


Heavy or light cleaning . . . industrial or consumer use . . .

Poly-Tergent® surfactants

Liquid and powder detergents are doing so many jobs these days, it makes sense to be sure the surface active agent you use is best for your product application. What's the big job to be done? Need an effective detergent? A dispersant? An emulsifier? A wetting agent? The extensive Poly-Tergent series of Olin surfactants gives you your choice to meet the specific need.

Poly-Tergent surfactants are produced from both aromatic and aliphatic alcohols, with different ethylene oxide contents to meet your specific formulation requirements. Because, for your product or process, one may be more effective as a wetting agent, another as a detergent, you'll find it helpful to have technical data on hand for all the Poly-Tergent surfactants. Personal assistance is also readily available. Simply phone or write your nearest sales office. OLIN MATHIESON, Organic Chemicals, 745 Fifth Avenue, New York 22.



assure effectiveness

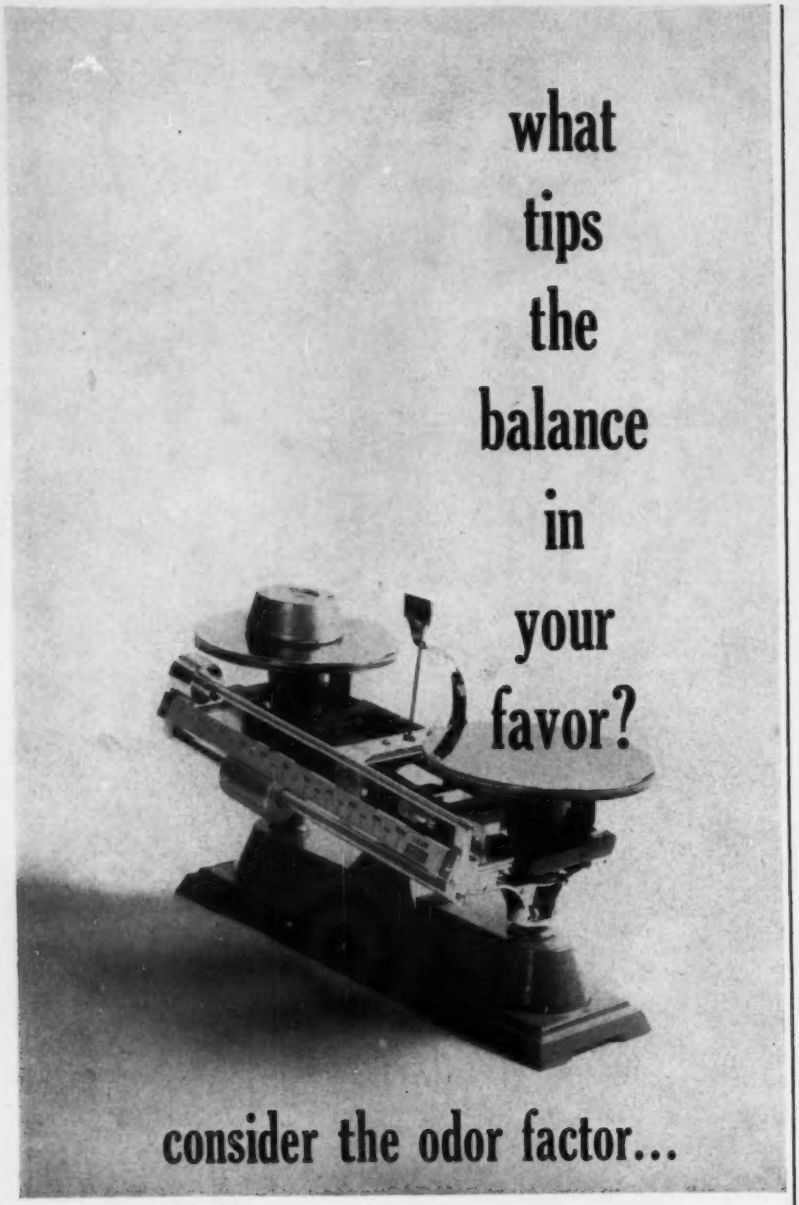
Some uses for Poly-Tergent surfactants:

• Wetting and detergent action in industrial cleaners • Dispersants and emulsifiers of natural greases and oils • De-inking, de-pitching and other paper processing • Practically all phases of textile processing • Compounding agricultural emulsions • Stabilizing latex paint emulsions • Creating antistatic effects in handling polyethylene film • Wetting agents for fire fighting and dust laying • Sludge dispersant in fuel oils • Emulsion breakers for crude oil emulsions • Wetting agents (with HCl) in acidizing oil wells

ORGANICS DIVISION **Olin**

Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Propylene Oxide • Propylene Glycols • Polypropylene Glycols • Ethanolamines • Glycol Ethers • Surfactants • Ethylene Dichloride • Propylene Dichloride

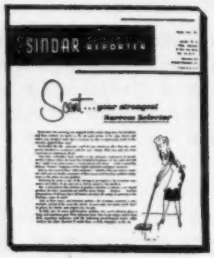
8930



For hundreds of industrial and consumer products, what tips the balance toward success can frequently be the proper odor. Yet the odor factor, so very important to sales, is often overlooked and misunderstood. Stop and think. Your product will have more customer appeal with a pleasant odor . . . or freedom from an objectionable one.

Odor is a factor in your new product. And no one understands its importance more than Sindar. So consult Sindar, specialists in odor for industry. Our vast resources and intimate understanding have helped hundreds of products find greater acceptance through the proper odor factor.

FREE! Send for the Sindar Reporter . . . our house publication that discusses the odor factor in detail for industrial products and problems. It's filled with important technical and marketing information that could be vital to your manufacturing and selling program. Receive it regularly without obligation. Write today.



SINDAR® Corporation

321 West 44th Street, New York City

build the second stage of an estimated $3.5-million laboratory expansions for Canadian Industries Ltd. in McMasterville, Que.

• Building additions totaling 4,000 sq.ft. were completed at U. S. Engineering Co. (Van Nuys, Calif.), a division of Litton Industries. Engineering facilities were expanded, as were laboratories for environmental testing, materials research and experimental circuit plating.

• Research-Cottrell, Inc. (Bound Brook, N.J.), industrial gas-cleaning equipment manufacturer, will move its research and development laboratory from leased quarters into its main plant (situated near Plainfield, N.J.).

• Purdue Research Foundation (Lafayette, Ind.) has signed the first tenant, Wabash Magnetics, Inc. (Wabash, Ind.), at Purdue Industrial Research Park.

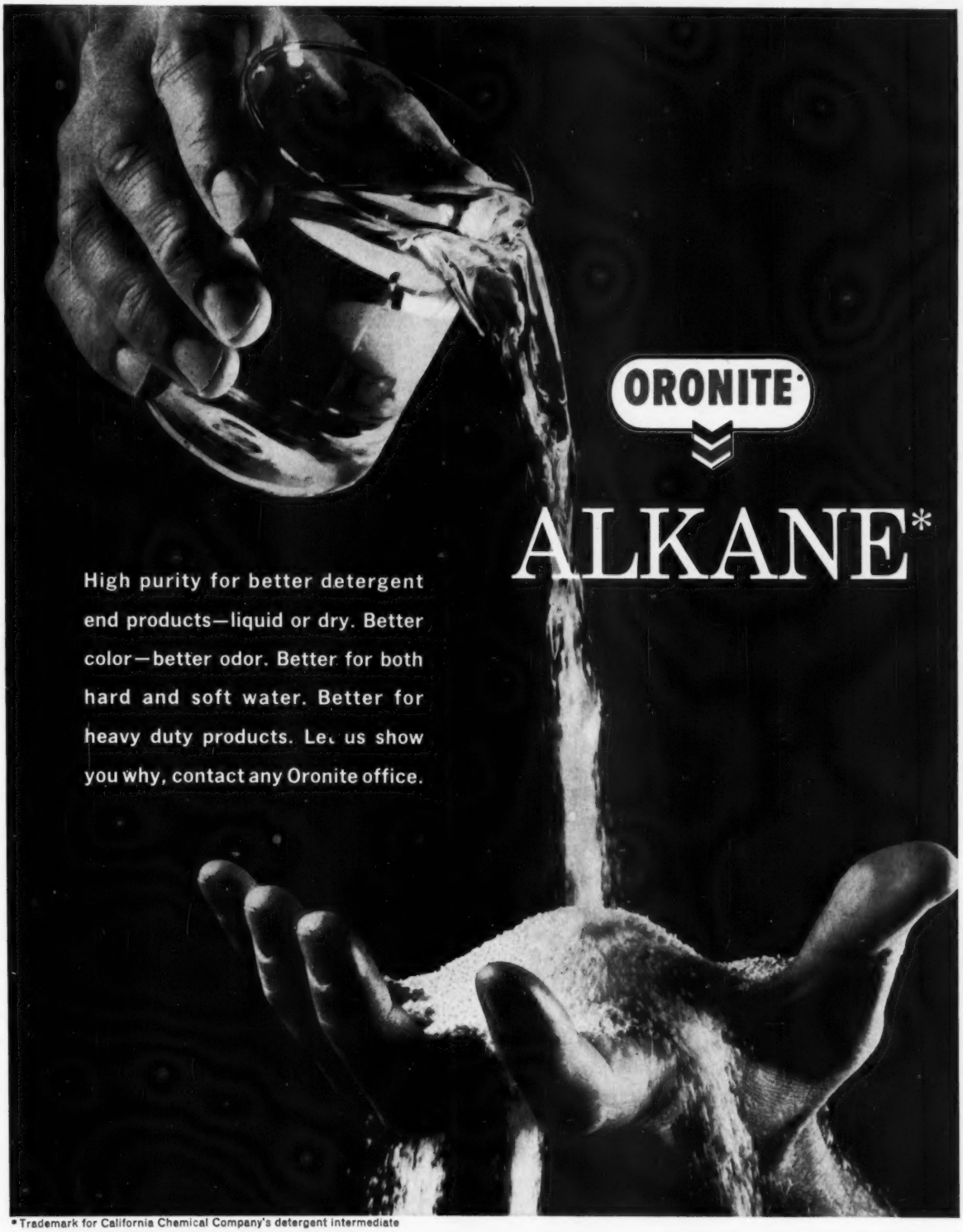
• Thompson-Hayward Chemical Co. (Kansas City, Mo.) has begun construction of a two-story, 20,000-sq.ft. laboratory and plant office building.

LITERATURE

• "The Plasma State" is a 190-page summary of the current state of knowledge of plasmas. A chapter on applications describes plasma spray coating, arc-jet plasma propulsion, ion engines and magnetohydrodynamic propulsion, energy conversion and power generation. The book is available from Reinhold Publishing Corp. (New York) for $6.50.

• "Searching the Chemical Literature" is No. 30 in the American Chemical Society's "Advances in Chemistry" series. An update of a previous edition first published 10 years ago, the 326-page book includes new sections on patent searching, Soviet technical literature, mechanical searching systems and nomenclature developments. Price: $6.50 from ACS (Washington).

• One of the recent publications issued by the U.S. Commerce Dept.'s Office of Technical Services (Washington) is an 11-volume Energy Conversion Systems Handbook sponsored by the Air Force. Covering all types of energy conversion applicable to space use, the 11 volumes can be purchased individually or as a set ($39.50).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ALKANE*
High purity for better detergent end products—liquid or dry. Better color—better odor. Better for both hard and soft water. Better for heavy duty products. Let us show you why, contact any Oronite office.

* Trademark for California Chemical Company's detergent intermediate

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CALIFORNIA CHEMICAL INTERNATIONAL, INC.
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Plants grow better beside water

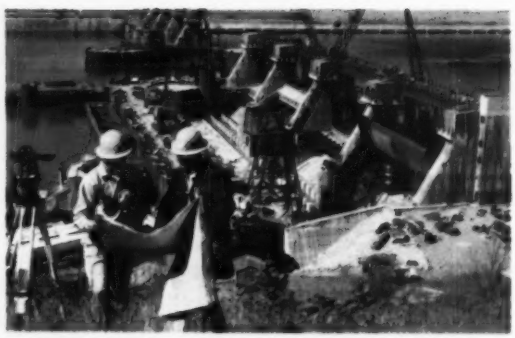
That's because an abundance of water is necessary for plant life. And those that have their roots at the water's edge can devote full attention to the problems of productivity.

Since 1953, more than 3,000 new plants have located on the Mississippi River System alone, not to mention the Great Lakes, the Gulf and numerous other rivers. Why? Mostly it is a matter of the "cost of living." Process water and plant utilities can be obtained economically; raw materials and finished products can be moved in and out at low cost.

If you are considering a waterside location, or plan to expand or modernize an existing plant, you are invited to call on Dravo's 60 years' experience in and around water. Work has been performed for the U.S. Army Corps of Engineers in every one of the past 60 years, including many lock and dam projects in the continuing program for improvement of the country's inland waterways system. Another activity is production and marketing of river sand and gravel. Hundreds of industrial plants are served by Dravo-built docks. Ships and barges laden with ore, coal, bauxite and other bulk cargo are unloaded by Dravo materials handling equipment.

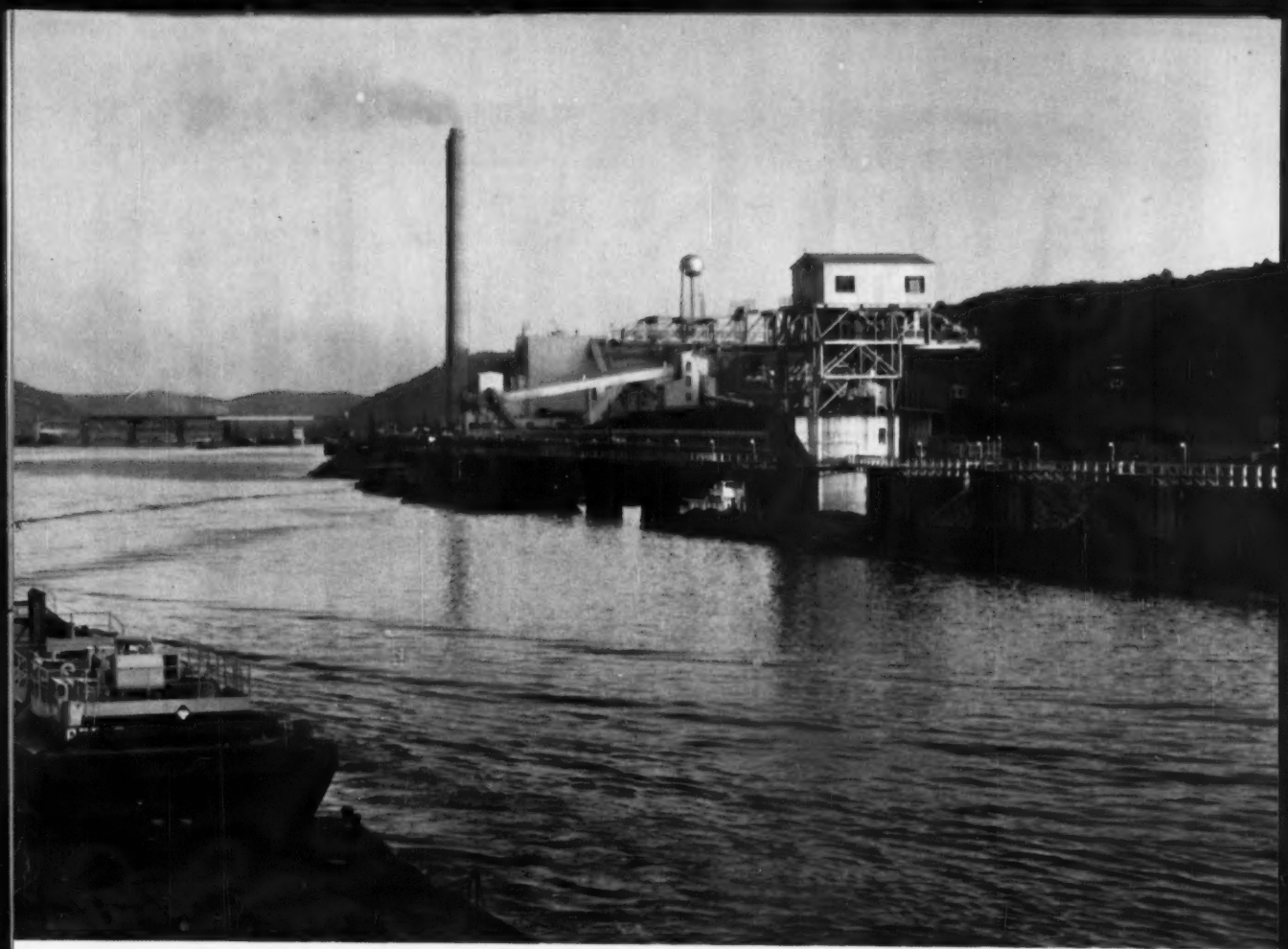
Pumphouses and water intakes, water and waste treatment facilities, steam or power generating plants, fabricated piping are also company specialties. Towboats, tugboats and barges launched at the Pittsburgh or Wilmington shipyards move almost every type of water-borne commodity. A subsidiary, Union Barge Line, offers common-carrier and contract transportation service on the Mississippi River System and Gulf Intracoastal Waterway.

The coupon can be used to obtain more information on these activities.



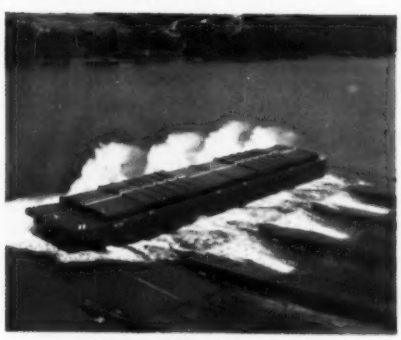
Marine construction experience includes giant dam and lock projects—commercial installations of all kinds.

Twin high-speed river towboats built for a New Orleans transportation company.



A Union Barge Line tow carries products of many industries.

Generating station, dock and unloader built on turn-key basis.



A covered hopper barge is launched at Neville Island shipyard.

Dravo Corporation, 4790 Grand Avenue, Pittsburgh 25, Pa.

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☐ Pumping Stations & Intakes ☐ Oxygen Steelmaking ☐ Steam & Power Plants
☐ Sewage & Water Treatment ☐ Ore Bridges ☐ Towboats & Barges
☐ Coal & Ore Unloaders ☐ Shafts, Slopes ☐ Fabricated Piping
☐ River Transportation ☐ Grating ☐ Container Cranes
☐ Sintering & Pelletizing Plants ☐ Space Heaters ☐ Compressor Stations
☐ Docks, Harbors, Foundations ☐ Oxygen Plants ☐ Process Machinery

Name_____ Title_____

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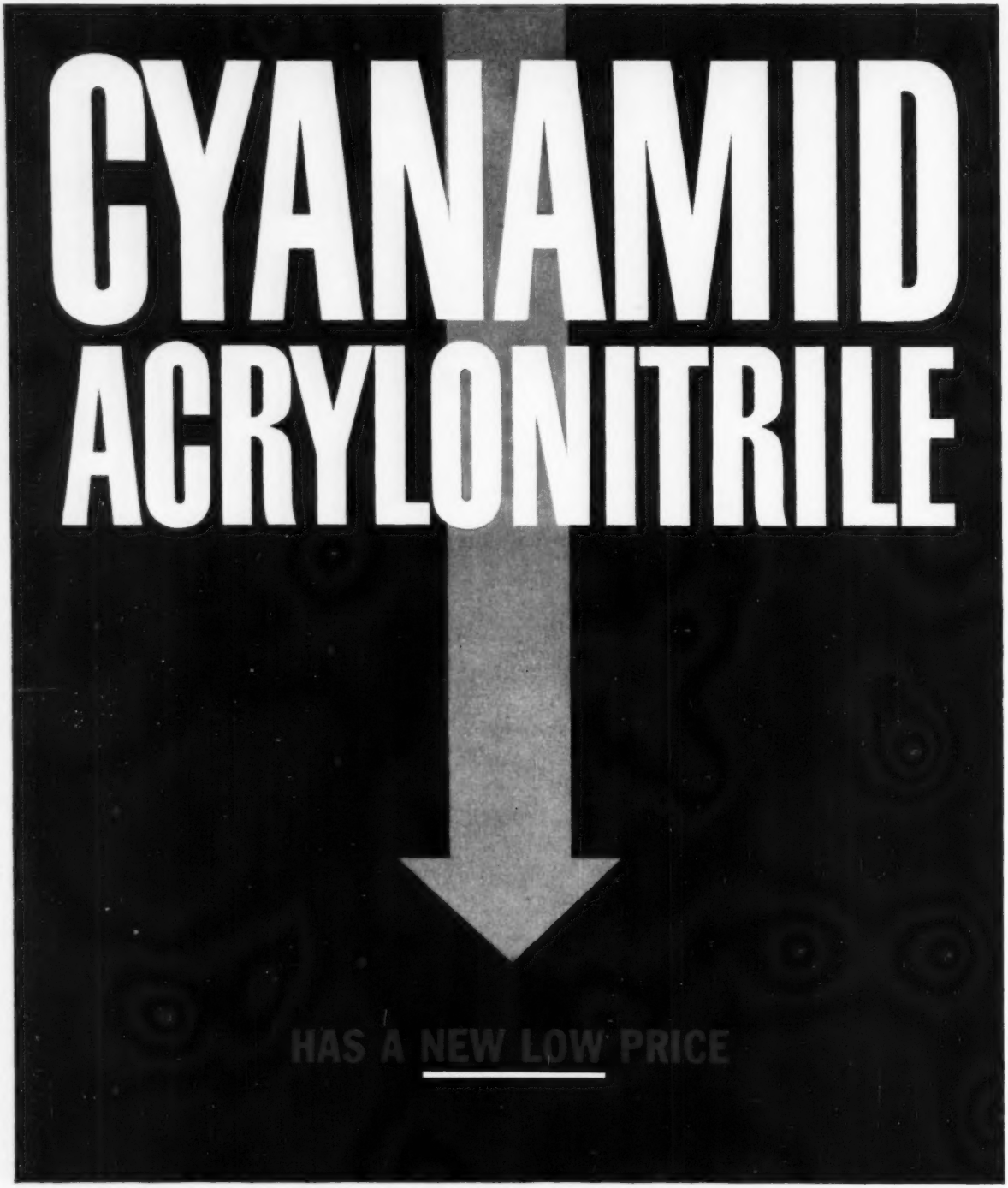
DRAVO

CYANAMID ACRYLONITRILE



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CYANAMID

Technology
Newsletter

CHEMICAL WEEK
November 4, 1961

A contract to explore a new method of power conversion was awarded to Westinghouse this week by the Aeronautical Systems Division, Wright-Patterson Air Force Base (Ohio). The contract will go to study of the Austin cell, a method of converting heat into electricity, on which the firm reported at last year's meeting of the American Rocket Society *(CW, Dec. 17, '60, p. 87)*.

The cell consists of iron, coated with vitreous enamel and covered with a thin coat of silver. Westinghouse placed thin plates embodying the principle into an ordinary household toaster and generated enough electricity to drive a small motor and its propeller. The firm is grooming the cell for aerospace jobs, feels that it might be the solution of problems involving temperatures too high for conventional power sources. For example, Westinghouse suggests use of the cell to generate power from the waste heat in rocket nozzles.

•

A drug to stimulate the brain's breathing center has given encouraging results at the Queen Mary Veterans Hospital in Montreal, according to the current issue of *The Canadian Medical Assn. Journal*. The compound, called Emivan (vanillic diethylamide), is suggested for respiratory failure as a possible adjunct to older remedies (e.g., tracheotomy).

•

Another industrial control computer, the TRW-530, was introduced by Thompson Ramo Wooldridge Inc. this week. The third in the company's line, it's a high-powered device useful as a scientific machine and a data processor, as well as for control work. Reportedly, 10 of the devices have already been sold.

•

Research on arresting the process of physiological aging was revealed by Monsanto at the dedication of its new research center in suburban St. Louis. By changing the amino acid balance in diets of seven-to-10-day-old chicks, company researchers were able to suspend physiological development for six-nine months. The chicks returned to normal growth processes when the imbalance was corrected. Development of newly weaned mice was also arrested; their life cycle was extended by the duration of the "suspension."

Carroll Hochwalt, Monsanto's research vice-president, says it is not possible to speculate on ramifications of the work. The long-range hope is that it could be an important therapeutic tool. Results so far have been so encouraging the National Institutes of Health has assumed sponsorship of further Monsanto Research in the field.

•

A new class of intermetallic compounds has been discovered by The Brush Beryllium Co. (Cleveland). Called beryllides, they're made by chemical combination between beryllium and a refractory metal. They can, says Brush, resist oxidation at temperatures of 3000 F. Also, they're

strong and lightweight (density approximates that of aluminum). This temperature operating limit is about 800 F higher than that available with uncoated alloys of columbium. Although the temperature limit is not as high as that available with ceramics, the new compounds are said to be more than 10 times as strong as ceramics.

The first of the line are two compounds of beryllium and tantalum, which contain no measurable amounts of free metal. Five other beryllides are expected to be introduced shortly—two with zirconium; three with columbium.

Small parts (cones, rods, tubing, etc.) have been made from the material through a variety of fabrication techniques (vacuum hot pressing, cold pressing and sintering, investment and slip casting, isotactic pressing and flame spraying). And the firm is bullish about prospects for scale-up. It has supplied powder to prime government contractors for about $300/-lb., says that price now will be less than half that. It expects to drop the price further as volume grows.

•

An epoxy resin that needs no curing agent was introduced by Shell Chemical this week at the Paint Industries' Show in Washington. Like Linde's new epoxy system (*CW Technology Newsletter, Oct. 28*), Shell's offering is a one-can method. There's a big difference between the two, however. Shell's new product, Eponol 55, is intended for use as a lacquer. By solvent evaporation alone, says Shell, the product forms a film that outperforms vinyl, chlorinated rubber and nitrocellulose lacquers for many jobs. Also, it has a high hydroxyl functionality and can be cross-linked with urea, melamine, triazine, phenolic resins, anhydrides and diisocyanates.

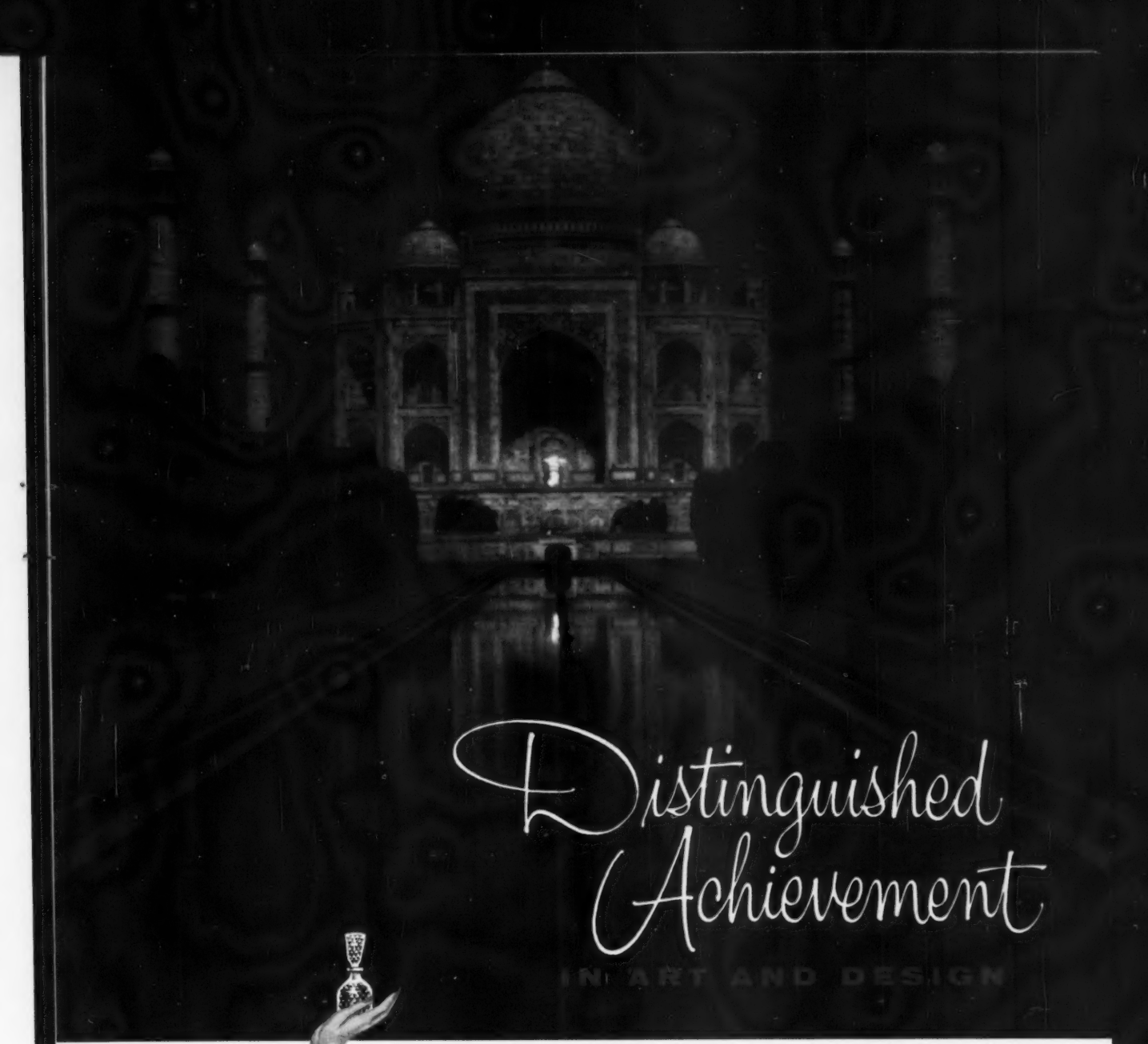
Shell is marketing Eponol 55 in two forms: -B-40 is a solution in methyl ethyl ketone; -L-32, in Cellosolve acetate. The firm sees applications for the material in automobiles, appliances, and other items. And it has developed formulations for "retail" lacquers and for aerosols, will offer these to qualified paint manufacturers.

•

A chemical to make flies sterile was revealed by Olin Mathieson at the formal opening of its agricultural research lab in New Brunswick, N.J., last week. It's Apholate—hexakis (1-aziridinyl) phosphonitrile—which the company tentatively plans to produce in '64. The compound was among 200 tested by U.S. Dept. of Agriculture researchers. It was 80-98% effective in causing houseflies that ate it or walked over it to become sterile (*CW, March 18, p. 95*). Olin has hopes of a $10-million/year market for it. The company is still looking for a bait (in cooperation with USDA). It's also studying possible commercial processes and synthesizing related compounds.

•

American Cyanamid is probing the potential of a new line of heavy-denier acrylic fibers. The new staple fibers range from 20 to 80 denier, are said to offer good dyeability and to have many physical properties of the firm's 15-denier acrylic staple.



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Creators and Manufacturers of Flavors, Fragrances and Aromatic Chemicals

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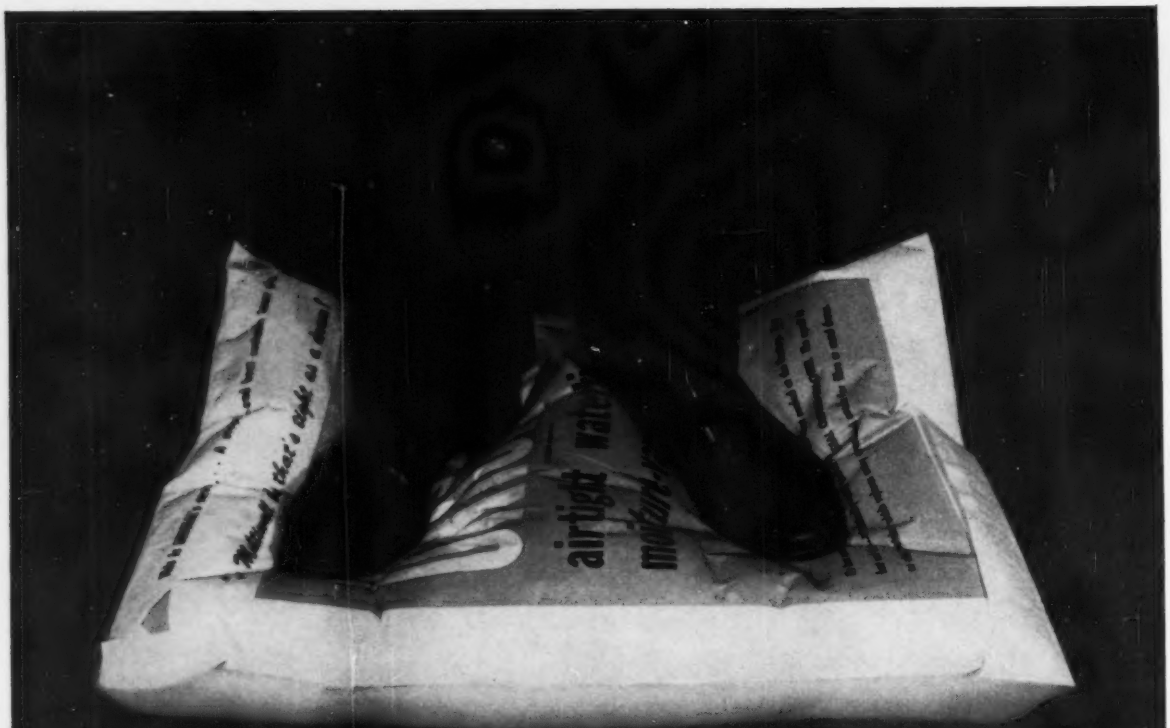


Discovered—an airtight multiwall!

Simple demonstration helps solve major packaging problem for Dow Chemical

The multiwall bag you see here contains nothing but air. The man standing on it weighs 200 lbs. Yet no air can escape. *That's because the bag is Union-Camp's amazing new UNISEAL.*

It ended a two-year search by Dow Chemical for a package that would provide a perfect vapor barrier.

Protection problem critical

The search began when Dow first developed an effective new crab grass killer. To successfully market this new product, an unusually tight package—even air-tight—was essential. The ideal package also had to be sturdy, printable, easy to handle and ship. And economical.

One day Dow engineers witnessed the UNISEAL demonstration you see above. If the bag could lock in air, then it must have the perfect vapor barrier. Further testing proved they were right.

Seals safely—and saves, too

The remarkable new UNISEAL bag features four plies. An outer sheet of semi-bleached paper (for top printability). Two middle plies of kraft. And an inner ply of kraft laminated to aluminum foil with polyethylene. A final extrusion coating of polyethylene resin over the foil serves as the heat-sealing medium for the inner seam and bottom.

The bag can easily be filled on *any standard filling equipment.* A special machine heat-seals the inner ply and applies adhesive to the tops of the outer plies. It then folds over the lip and pastes it to the outside of the bag. Finally, the machine centers a strip of gum tape over the edge of the lip to form a positive *air-tight* closure.

UNISEAL'S unique inner ply is made of kraft paper laminated with polyethylene to aluminium foil. Bags can be easily filled on any standard filling equipment.

Secret of sealing. Special machine heat-seals inner ply, folds lip over and pastes to outside of bag. Finally, gum tape is applied (arrow) forming a positive air-tight closure.

Apart from providing a perfect vapor barrier, Union-Camp's UNISEAL bag also turned out to be the least expensive container of any previously tried!

How much could a Union-Camp multiwall idea save you?

Hundreds of companies, large and small, have cut costs through Union-Camp multiwall ideas like this. Our comprehensive packaging service—5-Star Plan—covers bag construction, design, specifications control, packaging machinery and a survey of your plant. And it's free.

See your local Union-Camp multiwall man for complete details.

FREE 16-PAGE BOOKLET shows how packers like yourself have achieved greater economy in their multiwall packaging operations. Write Dept. M-4.

UNION-CAMP
MULTIWALL BAGS
Union Bag-Camp Paper Corporation 233 Broadway N.Y. 7, N.Y.

For the economy–and for the chemical industry especially–'61 is a year of contrasts. Sales records are being broken; production dipped, but is now climbing; and profits are middling. It is no boom year; but it is a good year–that is the . . .

PATTERN of '61

With scarcely eight weeks of the year remaining, the ultimate '61 economic pattern has pretty well taken shape. For the economy and industry generally—and chemicals in particular—the year as a whole has been one of contrasts, but will check out with more pluses than minuses.

Total U.S. industrial production, especially since midyear, has bounced along at a much brisker pace than in '60; inventories, finally, are beginning to be replenished; gross national product annual rate has soared to over $520 billion; chemical sales will set a new high.

On the other side of the ledger, profit margins aren't yet wide enough to noticeably brighten dollar-conscious management; excess capacity is still a big problem in most industries, and has become increasingly acute in the chemical field; price levels did not rise high enough to offset increasing costs of production.

The Big Picture: But one must look first at GNP to get a good idea of the basically robust health of the economy. The current year's average, about $520 billion, will outstrip the '60 record by a good $16 billion. That would be a $36-billion increase over '59. But the quarterly rise in annual rate has been even more impressive; for the final three months of the year, GNP is projected at about $540 billion. And official estimates peg the increase in the third quarter to a seasonally adjusted annual rate of $526 billion, from $516 billion in the second, and the low $501-billion first-quarter rate.

The Federal Reserve Board Index of Industrial Production is another accurate barometer of the nation's economic fluctuations. Note the whiplash of activity *(see chart, p. 106)* that since June has kept the '61 plotting points consistently climbing above last year. The index, however, up a

point in August, was held back in September chiefly by the strikes in the auto industry.

Plant Spending Down: Some estimates indicate that '61 plant and equipment expenditures by durable goods manufacturers will be off about 5% from last year ($7.2 billion vs. $6.4), with steel and autos showing even larger drops. Outlays for nondurables, though, are expected to be up 3% over '60—over $7.5 billion as against $7.3 billion. Chemicals, petroleum refining and food processing accounted for the major share of the change.

Capital spending for chemical and allied products production will have chewed up an earmarked $1.65 billion by the end of the year, compared with $1.6 billion in '60. And following a well-defined trend of the past several years, bulk of this money has come from internal sources (set aside for amortization, depreciation and depletion allowances, retained earnings).

U.S. corporate cash flow, internal funds out of which amounts are available for new plant and equipment expenditures, says McGraw-Hill's Dept. of Economics, is higher this year—at $33.5 billion—than at any time in the past. It bodes well for such investment next year.

Increased spending by government, particularly state and local, did much to temper the recent mild '60-'61 recession. State and local purchases of goods and services actually topped $51 billion in '61—about 10% of the gross national product; it was less than 4% in '46.

Federal defense spending, because of Berlin, Laos and other hot spots throughout the world, has been running at about a $50-billion/year rate. This plus a step-up in federally financed roadbuilding, housing, and other programs, will boost total national-state-local government spending to an all-time high of nearly $110 billion.

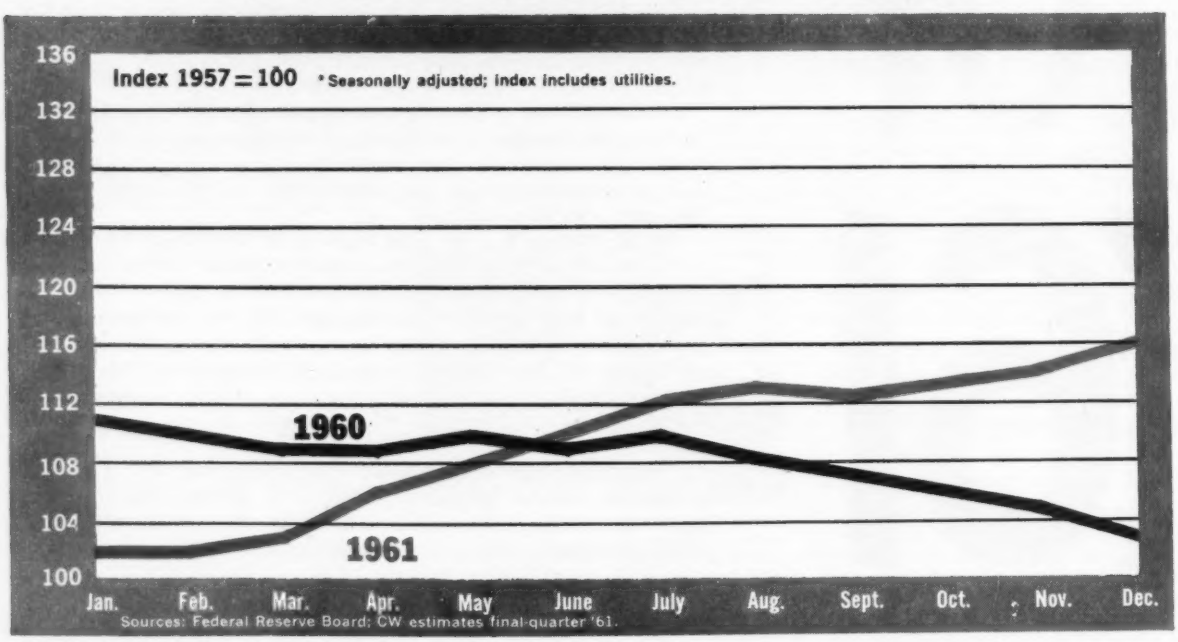
'Tops' for Chemicals: For the chemicals and allied products segment of the CPI, '61 was a busy year, for the most part. Recovery from the late-'60-early-'61 dip was rather rapid as indicated by the FRB index of production (*see p. 107*). By midyear, with sales totaling more than $14.5 billion, it was clear the industry was heading for a new record. All indications now point to a new high of close to $30 billion, compared with last year's $27.7 billion, and '59's $25.7 billion.

Chemicals production, as measured by the FRB Index, averaged about 6.5 points higher than the 121.5 average in '60 (*see p. 107*). But new highs do not necessarily mean higher profit margins. These are still being pinched by rising manufacturing costs, acute competition, price and other concessions. Net income after taxes as a percent of sales (based on FTC and SEC data—*see p. 114*), may have inched up just above the '60 mark, to about 7.60% vs. 7.51%

Because of the acceleration in the second half of the year and the increase in gross income, chemical profits probably totaled slightly more than $2 billion, on par with '60. As for dividends, all signs at this moment point to the industry topping the more than $1.04 billion record of last year. Some companies plan to be more generous with year-end extras than they were in Dec. '60.

Think Big: It's been a big year for corporate changes; mergers, acquisitions, joint ventures were almost common occurrences during '61; there were several dozen significant "marriages" and purchases. Typical: Diamond

U.S. Industrial Production:* The pace is brisker



Sources: Federal Reserve Board; CW estimates final quarter '61.

Alkali's takeover of Bessemer Lime, Chemical Process, and Fiber Chemical.

At least five major joint ventures were launched: the Atlantic Oil-Pure Oil petrochemical project to produce benzene, toluene, xylene; Ansul Chemical and Continental Oil formed Ancon Chemical to make and sell methyl chloride; Swift & Co. and Skelly Oil's jointly owned venture Hawkeye Chemical (ammonia); Enjay Chemical and J. P. Stevens bought National Plastics Products to produce polypropylene fibers; Kermac Potash was set up by Kerr-McGee and National Farmers Union.

Three other joint ventures—two in Canadian potash, one in primary aluminum—are in early study stages.

Scrambled Labor Relations: By and large, production and maintenance workers in chemicals and allied products have reason to be satisfied with '61. Employment held up during the recession months; hourly earnings increased from the '60 average of about $2.52 to a probable $2.61 this year—a gain of 9¢, compared with a rise of only 6¢ in the average for all manufacturing industries.

But labor union leaders are distinctly less satisfied. Most unions have been losing members (because of automation, the recession, and companies' cost-cutting drives). Chemical unions, though holding their own in membership totals, have not been able to mount an effective organizing campaign. Another indication of CPI employees' less-than-fervent mood about unions: refusal by delegates to the recent Oil, Chemical & Atomic Workers' convention to ratify any dues or per-capita rate hike.

Within the CPI, interunion relations range from bickering to vendetta. The latter term is applicable to the continuous contention between UMW's District 50 on the one hand, and any and all AFL-CIO unions on the other. Raiding is the rule; cooperation is a rarity.

Because of such interunion strife, and because of strong tendency of CPI companies to integrate (horizontally and vertically) across industry lines, some union leaders are advocating a four-way merger of the AFL-CIO's Chemical Workers, Rubber Workers, Textile Workers, and OCAW. Last week this movement got an indirect assist from the Chemical Workers' executive board (*see p. 46*).

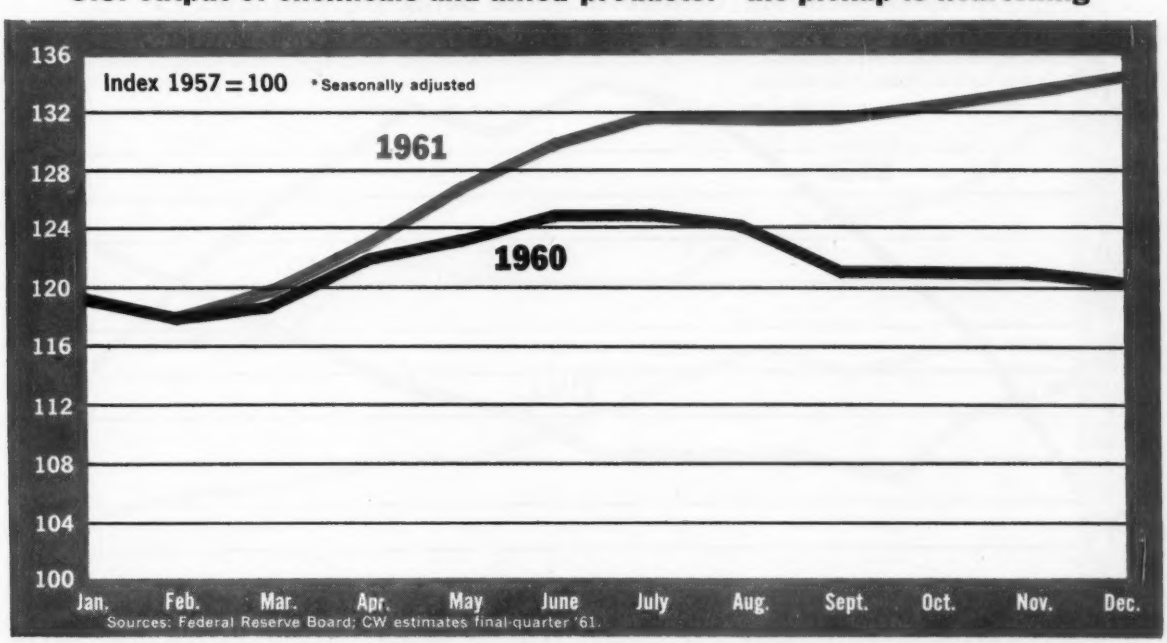
Washington Roundup: As might be expected in the first year of any new Administration, Congress did little in '61 of direct consequence to the chemical process industries. Most of the legislation affecting this segment of the economy was put off until '62, as a harried Congress went to work on broader measures of the New Frontier.

Much of the action was of a talking nature. Sen. Estes Kefauver (D., Tenn.), a constant critic of the drug industry, kept the pressure on; his series of hearings was designed to show monopoly and excessively high prices. But Kefauver carefully avoided bringing to the floor of the Senate his bill to clamp stricter controls on the industry and to shorten the life of patents. These will be brought up next year—if he wins sufficient support.

Kefauver was ably abetted, again mostly with words, by Chairman Paul Rand Dixon of the Federal Trade Commission and Lee Loevinger, head of the Justice Dept.'s Antitrust Division. Both expressed particular concern over prices, alleged conspiracies to maintain price levels, and monopolies.

The House did pass, overwhelmingly, a bill to permit

U.S. output of chemicals and allied products:* the pickup is heartening



Sources: Federal Reserve Board; CW estimates final-quarter '61.

PATTERN OF '61

CW SPECIAL REPORT

Du Pont shareholders some tax relief from the court-ordered divestiture of General Motors stock. But a small group of senators, headed by Sen. Albert Gore (D., Tenn.), blocked action in the final days of the session. The bill is expected to win Senate approval early next year.

Congress also failed to act on a request by the Food & Drug Administration to extend, beyond next February, the date for business to comply with the new Hazardous Substances Labeling Act.

Of more direct concern, Congress did lend more money, and a big boost, to programs aimed at finding economical ways to convert salt water into potable water, and to clean up the nation's water supplies. The huge new urban redevelopment program approved by Congress also will have its effect on the CPI in the years ahead.

Still pending, of course, is some kind of tax relief for the CPI generally. This may come in '62—perhaps similar to the rapid tax write-off relief granted the textile industry; it could also come in the form of the Administration-sponsored 8% tax rebate on new equipment.

Eyes Abroad: Despite tensions abroad, and 50-megaton bombs, U.S. chemical companies continued to gamble for profits in overseas operations. McGraw-Hill's investment survey taken a few months ago, showed that U.S. firms planned a '61 expenditure of about $275 million. This is 16% more than was spent abroad in '60. When final and official figures are compiled for the current year the total could be somewhat lower. Reason: the darkening international scene.

Most dangerous spot, Berlin, probably will not have a great deal of effect on investment plans. Some companies feel that if conditions get so bad that their West European investments are endangered, they won't be very safe in the U.S. either.

A lot of money, though, about $77 million, was earmarked for projects in Latin America. Earlier this year, Brazil was tagged as one favored site for new U.S. ventures, but its unsettled political picture that resulted from Janio Quadros' departure from the Presidency may have deferred some projects.

U.S. exports this year, despite a slight leveling off in Europe's economic boom and keener competition, have been increasing. At the eight-month mark, exports were about 3% higher than in the comparable period in '60. Total dollar value of exports for '61 could hit $1.75 billion vs. '60's total of $1.68 billion.

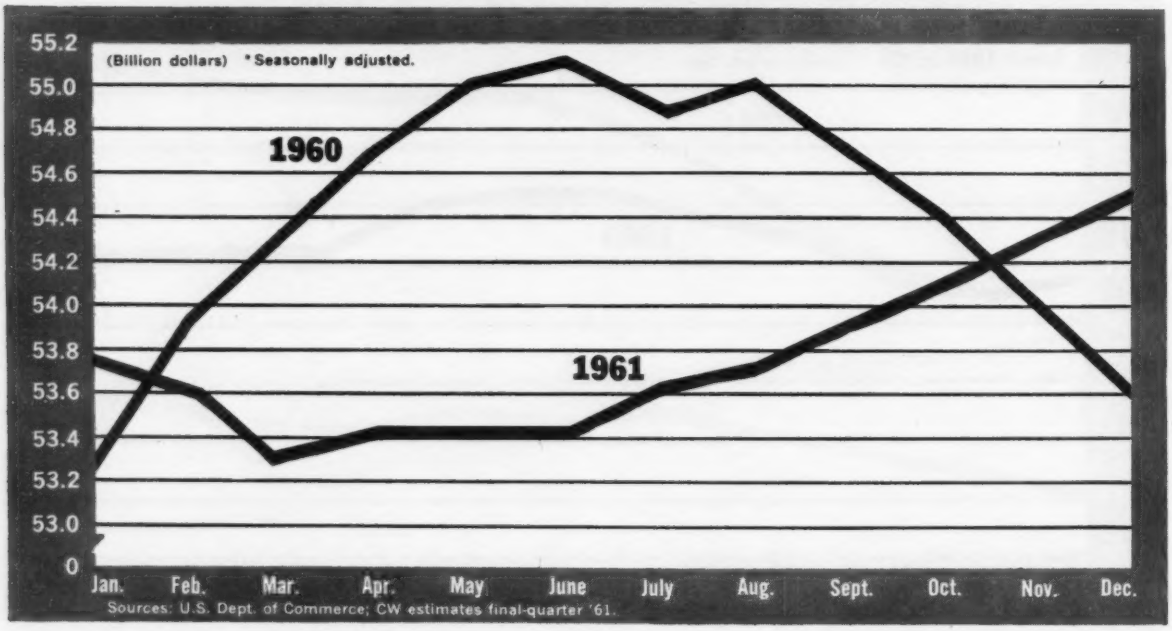
Imports, meanwhile, have been climbing at a faster rate as business improved in the U.S. By Aug. '61, value of foreign chemicals and allied products hitting the U.S. was nearly $267 million, up more than 10% over last year. At that rate, the '61 total could exceed $385 million as against the '60 figure of $353.2 million.

Economic Eddys: Despite the generally-expected brighter outcome for the chemical industry as a whole this year, there have been—and are—many crosscurrents at work. Not the least: price weaknesses in polyethylene, vinyl chlorides and other plastics materials.

Benzene, aniline, synthetic fibers, phthalic anhydride, ammonia, phosphates are also among the many chemical products that have been buffeted by a growing supply-demand imbalance, and consequent price softness.

The trend toward integrating backward to the raw

All-manufacturing inventories* are being replenished . . .



Sources: U.S. Dept. of Commerce; CW estimates final-quarter '61.

material stage (e.g., Du Pont into acrylonitrile), has also caused repercussions in the markets as noncaptive producers scratched around for new customers.

In '61 some chemical manufacturers demonstrated a remarkable, and unfamiliar, caution in "adjusting" prices. In other words, the practice of immediately following the leader—up or down—until recently so prevalent in the industry, appears to have abated. Case in point: polystyrene. Reaction to a recent 1¢/lb. increase by one maker was slow in coming. Not surprising was the fact that smaller producers hesitated in following suit, but even the top producers of polystyrene were cagey in posting higher prices, even on the time-worn pretext of "meeting competition." The industry is still not unanimous; some are waiting to see if the price hike will stick.

Market conditions were rough for many products in '61. Big xylene capacity expansions this year, for example, added to supplies at a time when use is expected to drop with the advent of petroleum naphthalene as a soon-to-be plentiful raw material for phthalic.

Continued new plant and expansion building throughout '61 practically eliminated all chemical shortages. This has been particularly noticeable (or will be soon), in polyethylene, polypropylene, phthalic anhydride, benzene, as well as in naphthalene and a raft of other commodities.

But balancing out the soft spots are the number of important breakthroughs and developments that have taken place in the chemicals segment of the economy this year.

In research, for instance, new product development in '61 continued to emphasize the growing importance of polymers. Polyaldehyde research finally resulted in a second commercial acetal resin (Celanese's Celcon trioxane copolymer) to challenge Du Pont's firmly entrenched Delrin polyformaldehyde. And ethylene copolymers of several types reached commercial maturity, culminating in Enjay's recently revealed ethylene-propylene rubber. Strides were also made in applying new techniques of block and graft polymerization, especially in the development of new acrylonitrile-butadiene-styrene (ABS) copolymers.

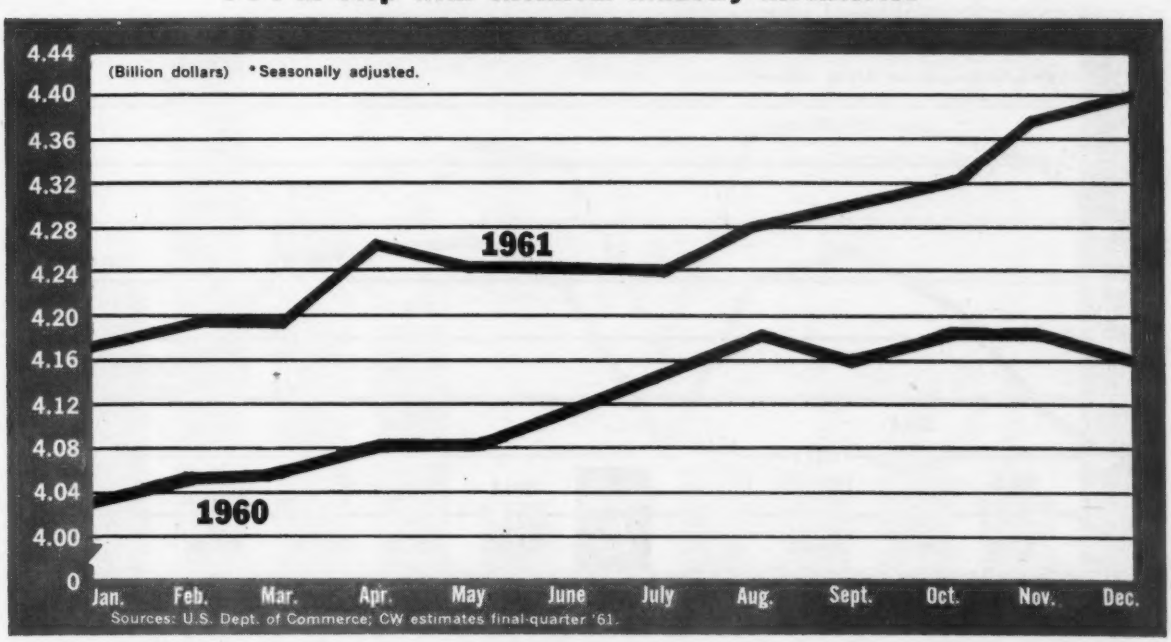
In the fuels area, solid systems gained on liquid chemicals during '61, but research on newer systems (nuclear, ion-engine) advanced so rapidly that flight tests are now scheduled. The very high and low temperatures encountered in aerospace uses have led to much work in the fields of alloys, coatings, functional fluids, thermally stable plastics.

For the most part, the chemical process industries insure their futures with heavy outlays for research and development. This year is no exception. Last year's R&D expenditures totaled nearly $1.44 billion; for '61, the CPI as a group will have increased such spending 5.6%, to a shade over $1.52 billion.

The percentage hike in R&D expenditures by chemical and allied products makers was even higher—some 6.1%. The comparative figures: in '60, $741 million; this year, approximately $786 million.

In the field of process advances, '61 may well go down as a banner year. Among the more significant: Development of blast-furnace use of oxygen, fuel gas and fuel oil to boost furnace capacities and cut coke consumption. The technique may well provide stiff competition for direct

. . . in step with chemical industry inventories*



reduction processes of iron ore; could result in lessening production of coal chemicals.

Several new isoprene processes were commercialized in '61, further severing rubber fabricators' traditional dependency on natural rubber.

Hydrogen-consuming outlets have grown to the point where exploding demands have spawned new techniques for its production. One method: steam-reforming of naphtha. While lower costs of fuel oil and gas may be a deterrent in domestic fields, naphtha as a raw material for hydrogen could become important in foreign oil- and gas-starved regions.

The long-touted use of sound waves to improve all types of processing, finally appears to have become functional, in one area at least—liquid defoaming. Teknika, Inc. (Hartford, Conn.) and General Precision's Kearfott Division (Little Falls, N.Y.) during the year came out with sonic generators for defoaming. Success, says Teknika, has been "considerable" in killing unwanted foam in chemical processing and production of pharmaceuticals, paper, detergent's and in other fields.

Another firm, Astrosonics Inc. (Syosset, N.Y.), has been researching the use of sonic energy to develop improved liquid spraying techniques, especially in the spray-drying of chemicals and food products.

Use of computers for process control got a shot in the arm during '61. The Garrett Corp.'s AiResearch Phoenix Division (Phoenix, Ariz.) developed a small, inexpensive pneumatic analog computer which, it is said, overcomes the big problem of electronic control by utilizing readily-available instrument air supplies.

Plant Contracts Up: Major new contracts (for plants costing $1 million or more) may well have totaled more than $1.6 billion in '61. That's up slightly from the $1.5 billion of '60, and is a result of the hefty fourth quarter volume that reached an estimated $400 million. (Comparable three-month '60 figure was $350 million.)

But while the current year's business was fairly good, it was less than had been expected. A spurt in new contracts at the end of '60 had contractors looking forward to a great year in '61. It didn't happen, because tempo of domestic contracts faltered.

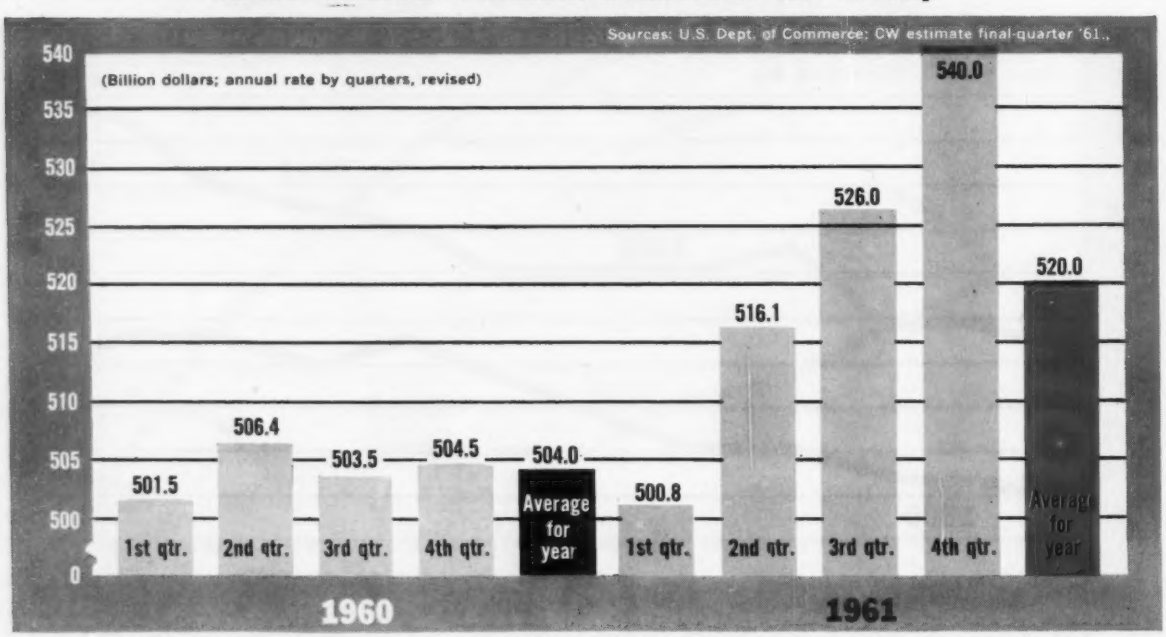
Over one-third of the contracts placed with CPI engineering and construction firms in the U.S., were for plants abroad. Proportion last year: about one-fourth.

Industry Revamps: Stiffer competition, domestic and foreign, has brought about noticeable changes in marketing functions, and a revamping in chemical companies' distribution methods. Tendency of chemical customers to increasingly demand faster delivery, frequently on one-day notice, has forced sellers to build warehouses closer to consuming points, enlarge truck fleets, and rely heavily on distributors.

On the other hand '61 brought intense efforts on the part of producers to persuade customers to equip their plants with facilities to receive bulk shipments. The effort to get delivery costs down has shown some progress; bulk shipping of solids, for example, has increased.

Many chemical marketers have made reselling arrangements (particularly in plastics) to broaden their product lines without the necessity of huge capital investments. For the producer, too, the advantages are manifold, not the

Gross National Product: Measure of the Pickup



least of which are prospects of high-level sales (with two sales forces in the field), and quicker payout on new plants.

While basic and intermediate chemical makers were wrestling with hard-sell problems, the nation's chemical specialties producers were chalking up some records in '61. One reason, of course, is the lower prices paid for many raw materials used in these products.

Soaps and detergents, for example, broke all previous six-month records in the first half of '61 with sales of 2.22 billion lbs., valued at more than $560.7 million. Premeasured products, now selling in one-shot laundry tablets, in dissolving packages, and in self-measuring cartons, will doubtless shoot the year's totals (volume and value) to the highest ever.

Aerosols are expected to sustain, and perhaps exceed, the 15% yearly growth of past years. One of the biggest trends this year has been the increased use of cheaper hydrocarbons with more expensive fluorocarbons. Union Carbide's move into marketing such propellent mixtures was significant. Other noteworthy developments include aqueous-based aerosols, and pushbutton powders.

Notebook Look: With all the offsetting factors—e.g., congressional investigations, restrictive laws, excess capacity, pinched profits and roughneck competition—the U.S. chemical industry, nonetheless, has been bustling with activity. Although the theme for the country generally is the same, variations in specific regions are significant enough to warrant closer looks.

From coast to coast and border to border, *CW*'s network of regional editors and reporters have done just that.

Here, in detail, and moving from West to East, is how chemical industry observers view '61 to date—and evaluate the year as a whole:

WEST

Up and down the West Coast, first and foremost in the minds of both operating management and marketing people is pricing. One-word description: rough. One major complaint—and this was heard country-wide—is that the products being hit with price cuts aren't small-volume items, but the multimillion-dollar products. "In areas like that," says one divisional manager, "it takes a lot of sales to make up a one-penny price reduction."

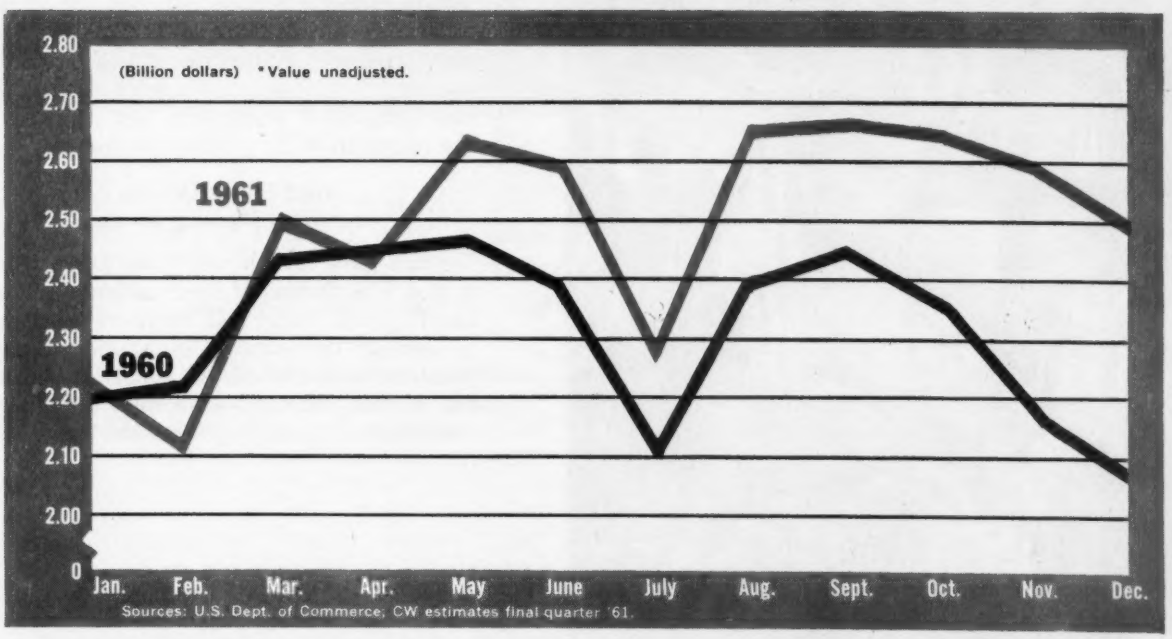
But a new attitude on pricing seems to be developing west of the Rockies. The big, important chemical consumers are easing up in their pressuring for lower, cutrate prices and concessions. Reason: many are beginning to realize that it isn't in their own best interests to keep chemical markets in a constant turmoil.

On the other hand, some Western chemical sellers themselves are putting a stop to cut-throat practices. These producers, pressured by customers to match others' undermarket tags, are telling the consumer that if he "can get a better price elsewhere he should take it."

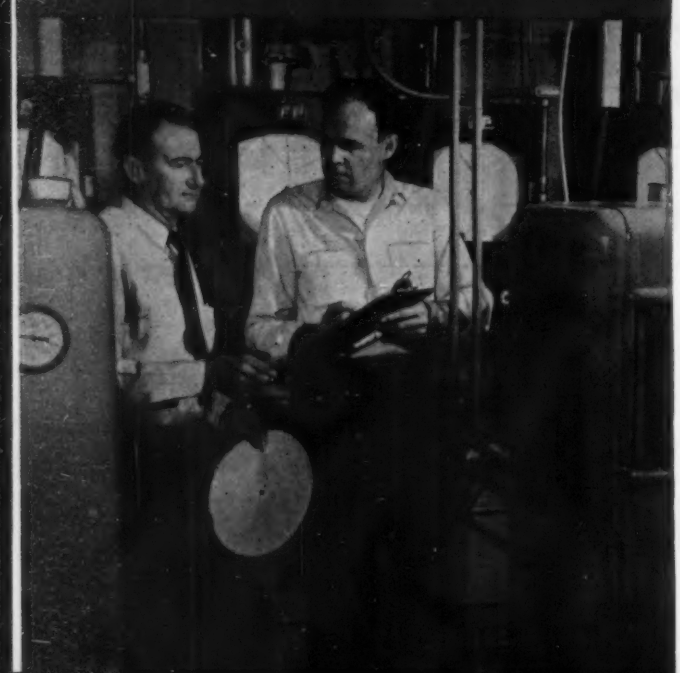
Despite such instances, though, the West is exhibiting a greater sales and production growth than the rest of the country. The FRB Index of Industrial Production for Aug. '61 was 5 points above the comparable month in '60. In the same period an index of business in California registered a nine-point gain.

One West Coast executive reports that for the first quarter, when national sales of his company were down,

Chemical Sales:* '61 climbs to a record



Giant F&P chlorination system helps water project outwit weather



Automatically maintains high quality of flows from 200 to 53,000 gpm

Beating the weather is the job of Southern California's Casitas Project, which supplies high-quality water—in required volume—to people in the Ventura River Valley. Erratic rainfall cycles and continually varying flows and raw-water quality complicate the task. But two great reservoirs and a 70-mile network of pipelines do the job efficiently—with a big assist from F&P's vast chlorination system.

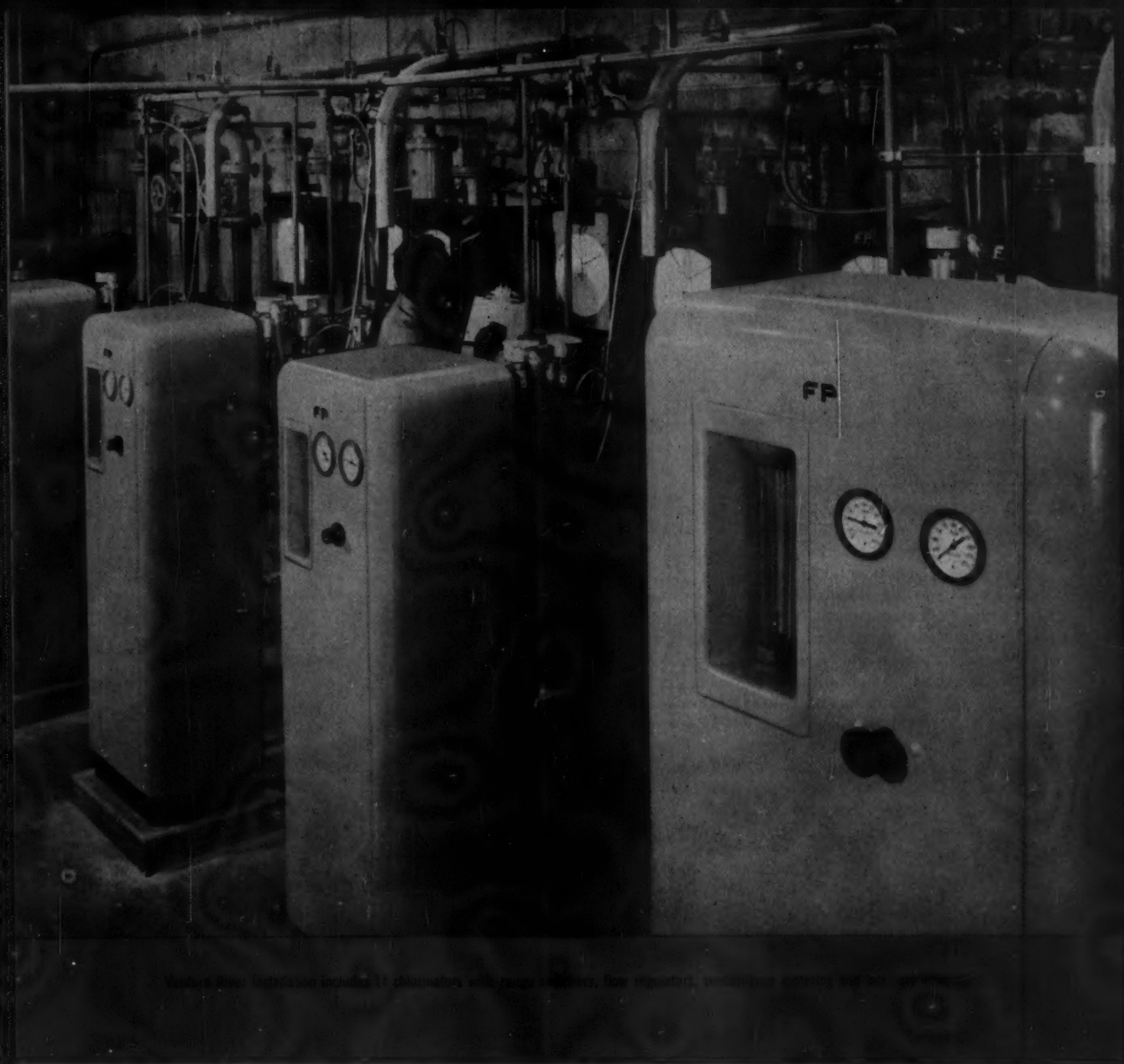
Fischer & Porter Instrumentation Called Key to Water System

With raw-water quality varying from hour to hour, *automatic adjustment* of chlorine is absolutely essential. "Dosing" must also be adjusted to handle early year minimum flows of 200 gpm through ultimate peak demands of 53,000 gpm. No single chlorinator or control could cope with such continual variations. *So* the system was designed with three separate units at each of its five chlorination stations. As the flow increases beyond the range of a specific chlorinator, a larger-capacity unit automatically takes over. The controls are interlocked so that only one chlorinator is in service at one time. Now entering its third year of nearly flawless service, this installation performs a key function in the operation of the giant water system.

Joint Efforts Develop Smoothly Working System

Ventura River Municipal Water District personnel, U.S. Bureau of Reclamation engineers, and Fischer & Porter staff members teamed up to develop the intricate installation. Design problems were worked out cooperatively and the system functions smoothly. Leland G. Bennett, General Manager, reports, "Operation

Leland G. Bennett, General Manager, and Robert Music, Operation Maintenance Supt., check the operation of F&P instrumentation at one of the five chlorinating stations.



of the system has proved more than satisfactory. The F&P equipment is well designed —easy to adjust."

Casitas Project Underscores Fischer & Porter Capabilities

The Casitas Project did more than demonstrate Fischer & Porter's capabilities in designing complete control systems. It also proved the ability of F&P personnel to work hand-in-hand with engineers and technologists of customer organizations—including start-up assistance and on-the-job engineering. Learn what this flexibility can do for you. For our over-all story in brief, write for a copy of Catalog 310. For a discussion of your specific control problem, call your nearest F&P field engineer. Fischer & Porter Company, 2211 County Line Road, Warminster, Pa. In Canada: write Fischer & Porter (Canada) Ltd., 2808 Jane Street, Toronto.

FP FISCHER & PORTER COMPANY

A world-wide Instrument Company with plants in Australia, Canada, England, France, Germany, Holland, Mexico and the United States.

the second and third quarters were about 7% better than the U.S. average. Generally, sales out here are 10% better than last year, compared with a 3% growth elsewhere in the nation.

Inventories are a specific problem in the West. Chemical buyers are shifting the responsibility for maintaining stocks onto the producers—and increasingly demanding fast, one-day deliveries. While a few observers expect inventory buildups to begin later in the year, at least one is convinced "you won't ever see inventory buildup again in some products." He calls this a new and tough form of price cutting—service that costs money.

Movement of heavy chemicals in the West is better than it was last year, but reports indicate that prices on items like sulfuric acid, nitric, chlorine and muriatic acid are being maintained, but rather shakily. Chlorinated solvents here (as in other sections of the country) are going through what is called "price adjustment."

The paper industry in the Pacific Northwest is facing an overcapacity problem; this is affecting chemical sales.

But on the whole, the chemical industry on the West Coast is already chalking up '61 as one of the "better" years. One firm reports a phenomenal 250% growth in sales of a single plastic resin over last year; another happily mentions it is "turning down orders" on certain types of polyethyene film because production schedules can't handle them; and yet another says its chemical business in the West is on consignment because "demand is so great."

MIDWEST

Moving eastward, the tenor of comments indicates just a slightly higher degree of optimism over the way '61 is turning out. Again, the "economy is on the upswing," but "profits and operating capacities could be higher." For many, hopes are pegged on a "very good fourth quarter" to bring up the level of '61 business.

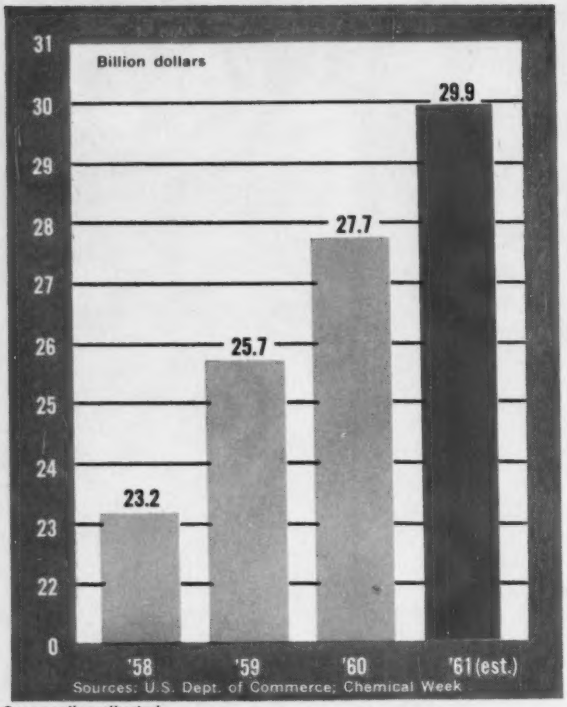
Actually, there is no doubt that these final months will be considerably better than the last-quarter '60, if only because the broad and wide Midwest, like other sections of the country, was then suffering the depressant effects of the economic setback.

At least one chemical company executive sees the disappearance of most economic dark clouds, the boost in defense spending, and introduction of several new products in '61 as setting the stage for a '62-63 "boom."

Oddly enough, the biggest concern being voiced in the Midwest this year—exploding nitrogen capacity—won't be realized until about '63. By then about 750,000 tons/-year of new ammonia capacity (equivalent to about 540,-000 tons of nitrogen), will contribute to a sure-fire ammonia glut in the corn-producing belt.

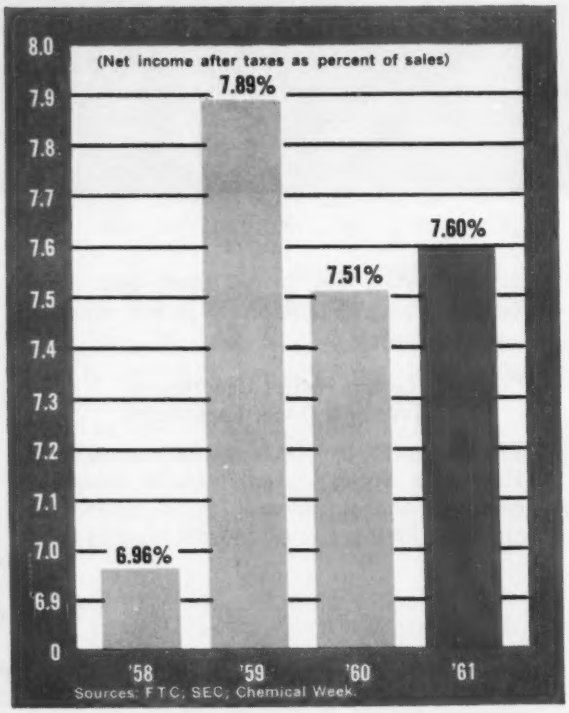
For the present, though, agricultural chemical sales generally are very good. Spencer Chemical, which operates on a July-June fiscal year basis, for one, reports it was "quite satisfied" with the ag chemical season. Its sales of these products were $31.3 million (39% of total sales),

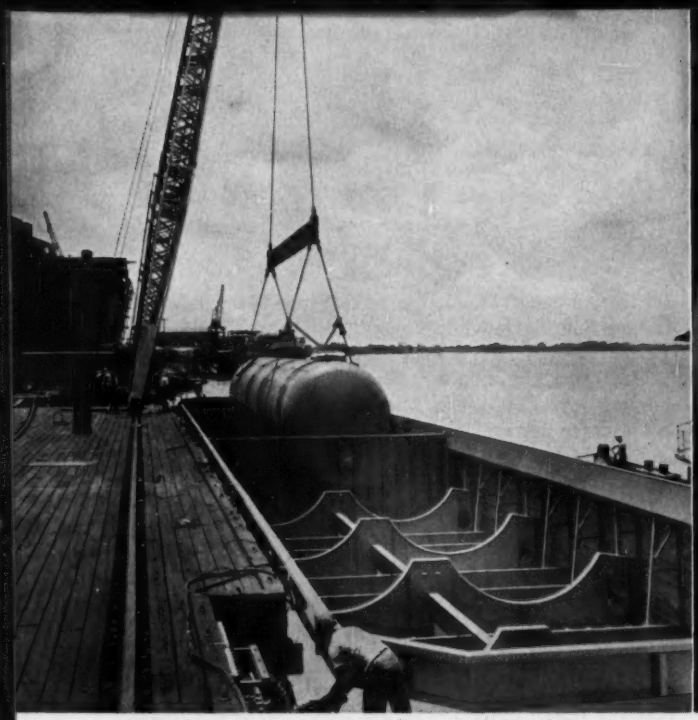
Chemical Industry Sales* Climb . . .



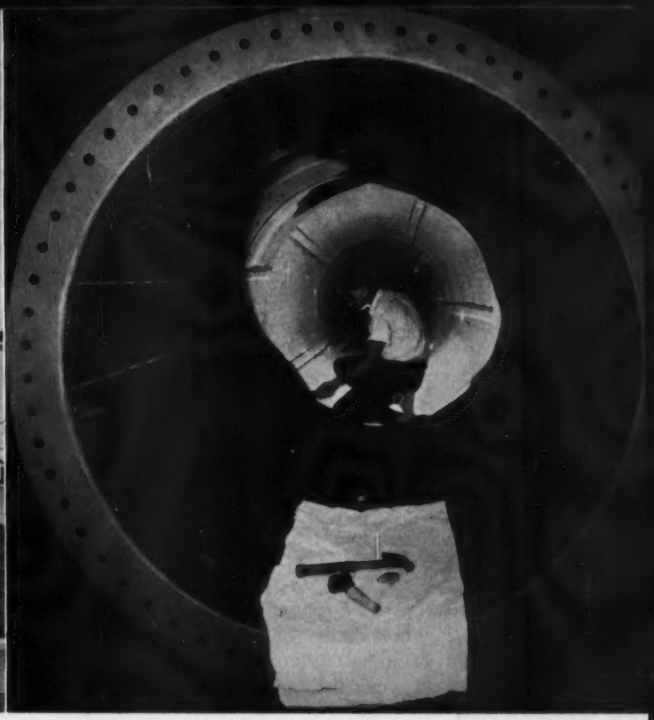
*Seasonally adjusted

But Profit Margins Are Erratic





165,000 gallon capacity cargo tank being lowered into saddles in petrochemical barge hull. Lifting device (partly shown) has 600 ton capacity.



Rubber lining being applied to unit of a chlorine system. Flow meters, valves and tanks are lined with speed and efficiency. Avondale is the authorized U.S. Rubber Co. applicator for N.W. Fla., Ala., Miss., S.W. Tenn., Ark., and La.

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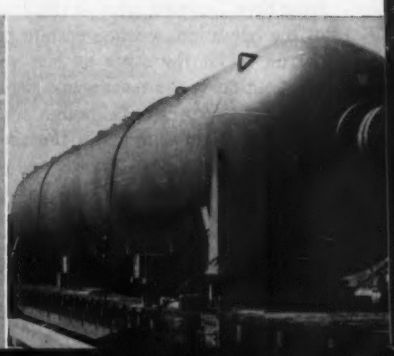
Ethylene storage tank for a large chemical company, shipped by rail. Avondale fabricates pressure vessels and storage tanks in the Main Yard, the strategic location of which permits delivery by truck, rail or barge.



and up 16% over the previous 12-month period. Industrial chemical sales also increased (from $10.7, to $11.8 million).

But midcountry polyethylene sellers are labeling '61 as the year the export honeymoon ended. In recent years overseas markets constituted one of the major outlets for U.S. polyethylene. But a continuing buildup of facilities here and abroad, plus skidding prices, has seriously hurt this phase of the business.

Polyvinyl chloride makers are hopeful that the price bottom has been reached. The plaint: very little margin left.

The synthetic rubber business centered in the Cleveland-Akron-Ashtabula section of the Midwest has been "good, but not booming." Volume of business has improved dramatically over the spring, and certainly is considerably better than last year.

The comment "good, but no boom" pops up frequently. One company spokesman uses it to spell out his prospects for the year, although sales are influenced by steel, autos, and metal-working industries. In major chemical lines, operating rates are running 70-80% of capacity.

Less residential building and import competition from Japan, England and France, is apparently hurting the Midwest's ceramics business. Drop in sales to pottery, glass enamels, and ceramic tile customers have cut operating capacities of producers to about 50%.

Midwestern chemical business sum-up, though, is probably typified by this report: "No big rush from any one industry is expected. We are getting a greater number of orders rather than increased size of orders. We still have the feeling that customers are living on minimum inventories, from hand to mouth. So increases in general business conditions will be reflected more or less directly in improved business for us."

SOUTHWEST

Turning the *CW* spotlight on the busy Southwest and the fabulous array of petrochemical complexes strung out along the Gulf Coast, reveals familiar and mild complaint: '61 won't turn out to be a "boom" year.

Sales pickup for the year (over '60) is generally expected to be 3-5%. Most chemical people queried report the tenor of business here parallels that for the country as a whole. Business was slow the first quarter, gradually picked up in the second, was "very good" in the third. Optimism is fairly prevalent over fourth quarter prospects.

But again, the big problem chemical makers are—and have been—coping with, is the cost-price squeeze. Measure of the condition: profits, despite higher sales, are expected to run about the same as last year at best. Heightening competition is the reason one firm is anticipating a falloff in earnings for '61, "although we are selling more."

Construction activity in the area is moving along well as expansion plans are carried out, but few chemical makers can report that they are operating existing plants at anywhere near capacity levels. Yet the supply-demand balance on most products over the year hasn't been too critical. Sums up one buyer-seller: "We haven't had trouble getting supplies, and we are able to fill all our orders."

Hurricane Carla had a slight effect on third-quarter business generally, but this was shrugged off as industry got back to normal quickly.

All in all, the Southwest industrial section of the country would have been happier with a busier '61, but there's little gloom over the lack of a boom.

SOUTHEAST

News from the Southeastern and Southern sections spells out almost a unanimity of expression with other parts of the country on the final outcome of '61; volume of sales is moving up to lift the year's totals, but profits may not match those of '60. But there is little pessimism.

In the last few years, the South has led practically all areas in the rate of chemical plant construction. The U.S. synthetic fibers industry is located chiefly below the Mason-Dixon line; primary aluminum and alumina production centers in Alabama, Tennessee, North Carolina, Arkansas, Louisiana and Texas and much of the U.S. atomic energy program is concentrated in the South.

And this growth isn't slowing down. During '61 the first U.S. petroleum-derived naphthalene unit (Ashland Oil at Catlettsburg, Ky.) shifted into high-gear production. Kaiser Aluminum & Chemical started construction of a $6-million hydrogen fluoride and fluorocarbon plant at Gramercy, La.; it was also building an aluminum fluoride plant.

Also in Louisiana, Borden Chemical revealed plans for vinyl acetate and methanol plants (adjacent to Monochem facilities at Geismar). And Mississippi paved the way, via constitutional amendments and tax breaks, for a whopping $125-million, Standard Oil of California-Standard Oil of Kentucky refinery at Pascagoula. The unit may eventually be the center of a huge petrochemical complex. In Kentucky (at Greenup), Hooker Chemical is building a "multi-million-dollar" phenol plant.

Such bustling activity, and there is much more, underscores the area's bright industry hopes for the future.

For the present, however, most chemical firms anticipate total '61 sales will edge up 5-10% above last year, result of concerted efforts to "hustle business." This, in many cases, included "coddling" customers, "giving a lot of service we can't recoup in better prices."

Supply-demand of chemicals is about the same as that noted in other areas—no apparent shortages, some items (fertilizers and other ag chemicals, alkalis) in the more-than-ample category.

EAST

From New England, down the East Coast, through the middle Atlantic States, and through chemical-crowded areas starting with Buffalo-Niagara Falls, to the Pittsburgh hub and south, consensus of '61 business can again be summed up in one four-part sentence: low in the first

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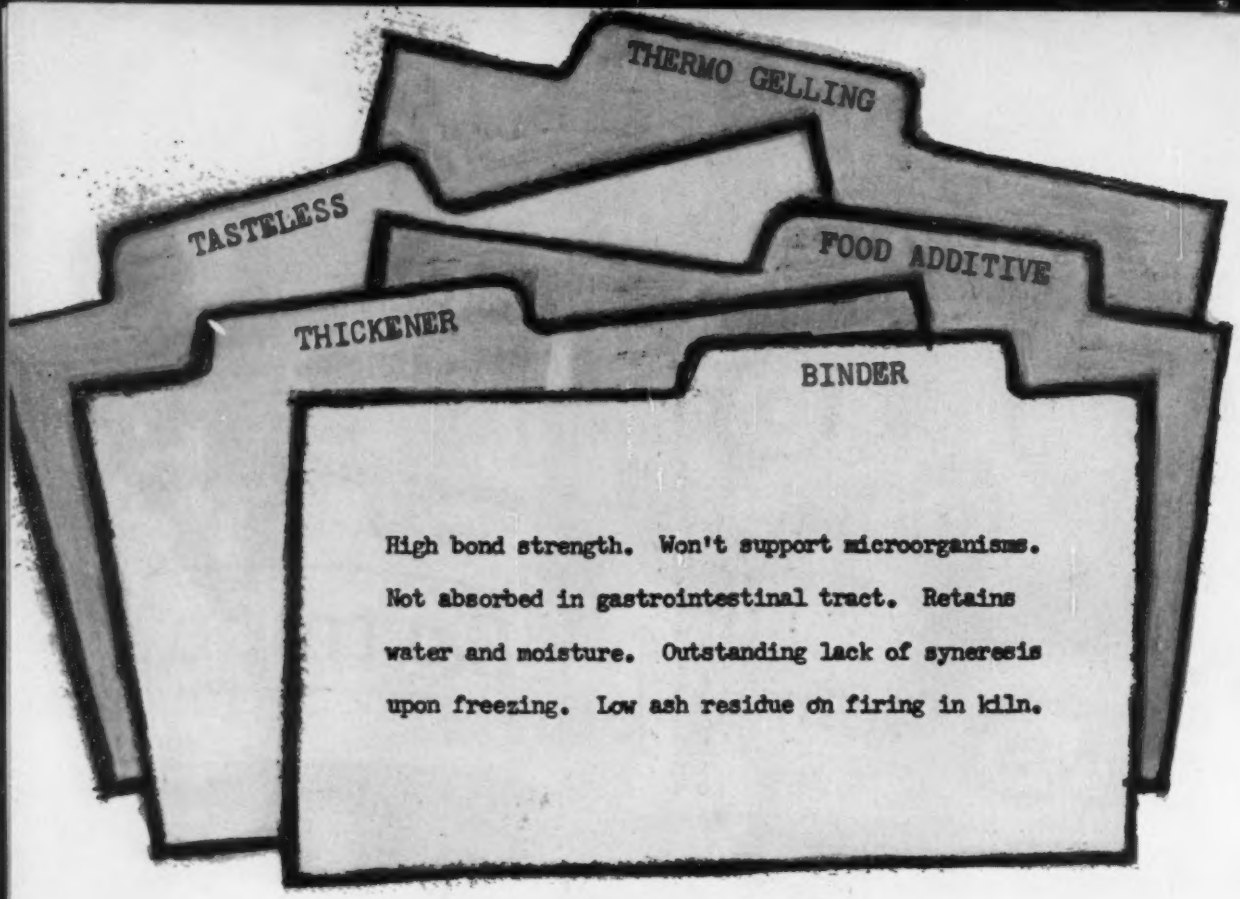
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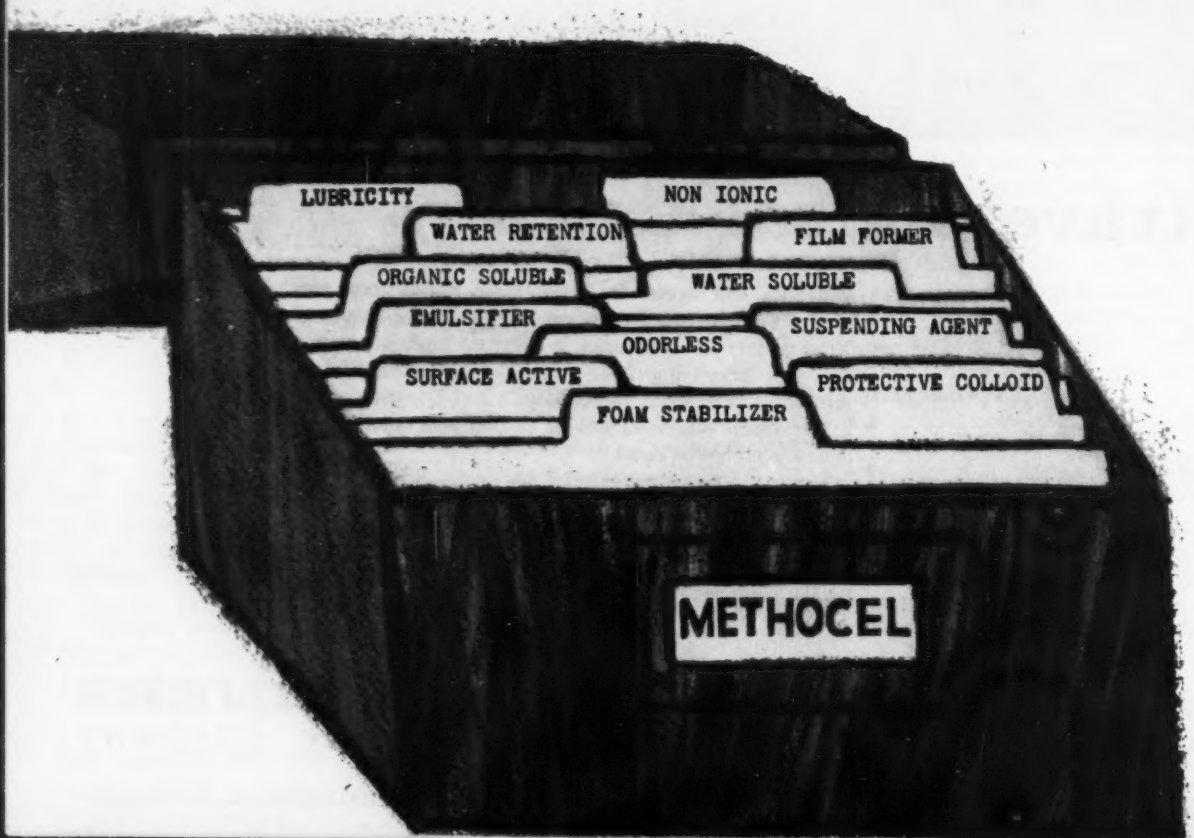

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The 17 properties of the Methocel® products can be fashioned into many unique and novel combinations to open up new ways to product improvement. Dow Technical Service specialists, with a solid background of experience working with this versatile chemical family, can help you put any of 41 different Methocel products to work improving your present product line, or aiding in the development of new products.

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THE DOW CHEMICAL COMPANY DOW Midland, Michigan

quarter, start of a pickup in the second, a third that wasn't too bad—high hopes for the final three months of the year.

But a new note was emphasized in this section of the country—the impact of foreign imports on sales and profits. As one textile company head put it in discussing his "depressed" sales and profits curve: "The threat is twofold: (1) direct imports from Germany, Switzerland, Italy and some from Japan; (2) foreign companies establishing American plants.

"To get American dollars," he elaborates, "a large foreign organization will set up a U.S. subsidiary that begins selling at below-domestic prices while being subsidized by the parent company abroad."

One way this is done, the report goes, is for the foreign company to purchase a relatively small American firm already in operation, bring in foreign materials to sell under the established domestic name. "It doesn't take long," he added, "for both product and personnel to become entirely foreign."

This spokesmen bitterly assails the domestic textile industry itself for some of its problems. "The most discouraging part of all this," he insists, "is that the textile people who have cried rivers over the 'deplorable import threat' have no hesitancy whatsoever in buying foreign chemicals for use in their mills."

His company is thinking of producing some of its own raw materials instead of buying them in the hope of "cutting down on production costs and thus competing to a greater extent with imports."

Along the Southeast coast two important segments of the chemical industry are ag chemicals and naval stores.

Reports a sales manager for one ag chemical firm: "Sales are up substantially over last year. Profit margins haven't changed, so profits are up commensurate with the increase in volume. We are highly optimistic about the last quarter —demand-supply of ag chemicals appear to be in good balance."

The Florida market, chiefly, is feeling the effects of imported ammonium nitrate limestone and calcium nitrate. They're coming in "in bulk."

Naval stores (rosin and turpentine) sales in '60 were high and prices strong. Because of this, '61 production was hiked—15-20%, says one source—and it was a mistake. Demand has not kept pace with this increased output during '61. Result: sales and profits will be off from '60.

In the chemical-complex areas of the eastern third of the nation (Pittsburgh, Philadelphia, Niagara Falls, etc.) industrial chemicals movement has been, generally, "marginally" higher than in '60, even with "fiercer" competition for outlets. It's reason, too, that more emphasis has been on service of all sorts—technical, delivery, distribution.

Steel industry vacillation has affected sales—and consumption—of acids (sulfuric, nitric, hydrochloric) in the East. Cut-throat competition and price weaknesses have reduced returns on aromatics, intermediates, sulfuric in these highly industrialized areas. Expanded capacities in caustic and chlorine (to name a couple), have some sellers "wringing hands."

Plastics (and this is a familiar dirge) are in a "sad state," especially polyethylene, styrene, polyvinyl chlorides.

Wrap-Up for '61: But on the whole, and despite the dark spots, the U.S. economy, and with it the CPI and chemical industry, appears to be, in this final stretch of the year, in rather fair condition.

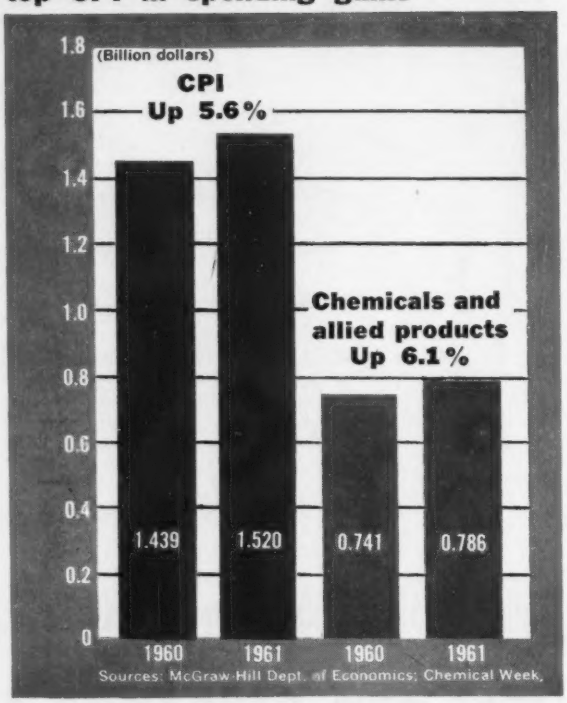
A report by Du Pont a fortnight ago on how "stronger-than-expected" business so far this fall had brightened its earnings prospects for the year may well be indicative of the over-all industrial tempo.

Du Pont's earnings forecast has now been revised upward; expectations are that these will now exceed by a slight margin, not just equal, last year's $381.4 million. Sales should be up about 2%, to near $2.185 billion, compared with $2.143 billion in '60.

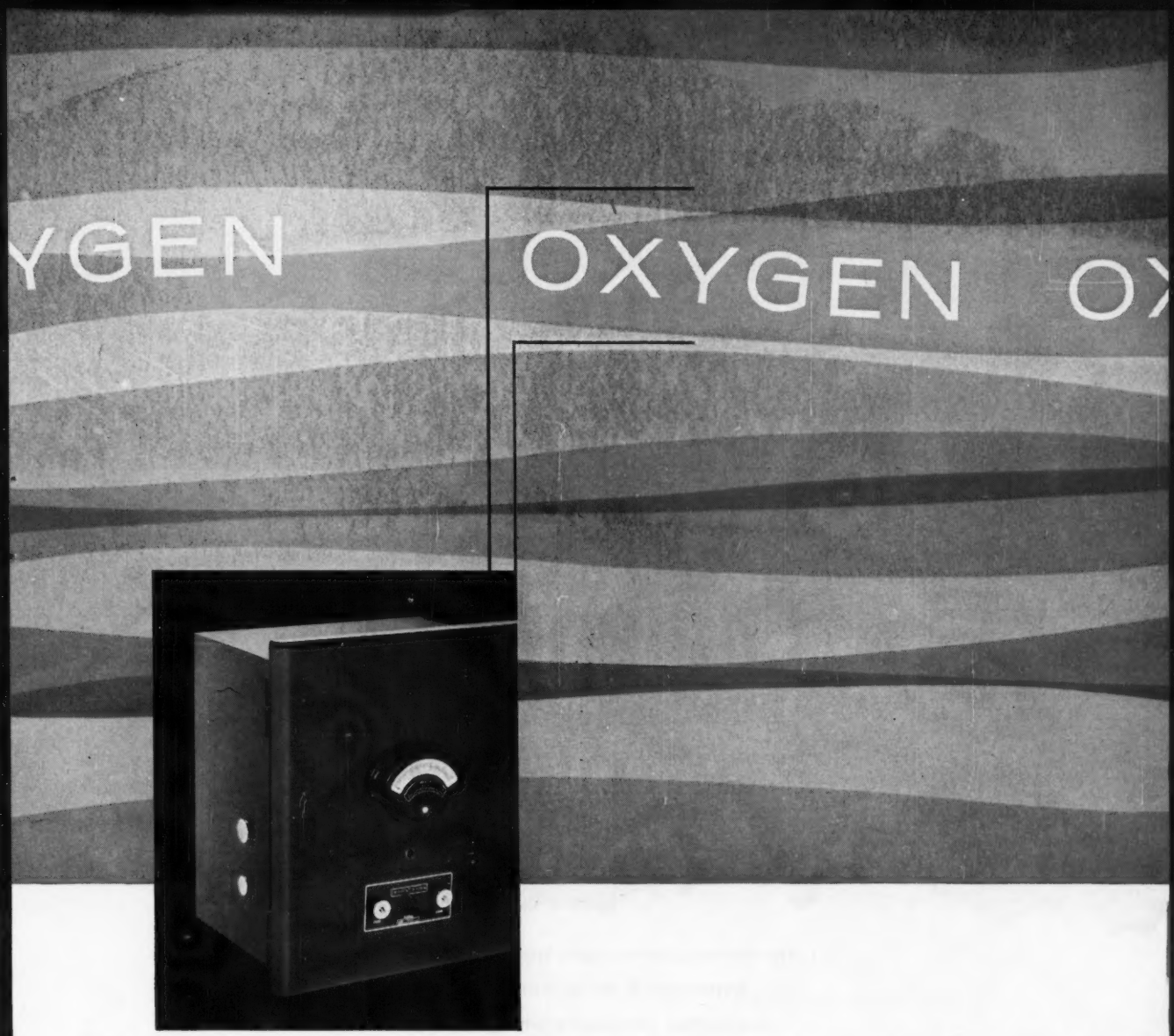
The upsurge in sales is spread broadly across Du Pont's product lines. Because of the diversity of industries that the company serves, this sales trend, concludes Du Pont's Treasurer R. Russell Pippin, "ought to be a reflection of advance in the general economy."

For an economy that was skidding into a recession less than a year ago, the reflection looks pretty good.

Research and Development: Chemicals and allied products top CPI in spending gains



Reprints of this report will be available for $1 each. Bulk rate on request.



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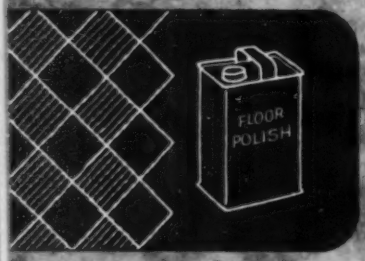
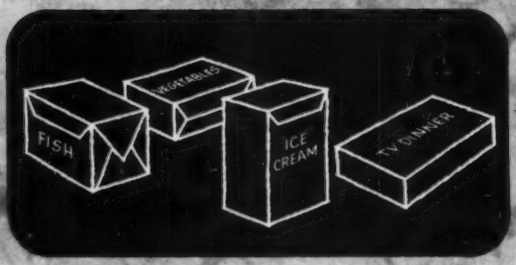
Paraffin Modification

As little as 2% of an Epolene resin adds significantly to the adhesive properties and tensile strength of paraffin coatings, thus reducing the tendency of such coatings to crack and flake.



Floor Polishes

As the wax component in floor polishes containing acrylic and styrene polymers and copolymers, Epolene resins provide maximum toughness and durability along with a natural slip resistance. Stable and low in color, Epolene pastes and emulsions are economical and easy to prepare.



Carton Coatings

Special cuts of paraffin blended with 20 to 40% Epolene resins provide high-gloss carton coatings of particular interest to packagers of frozen foods. Resistant to grease and moisture, the coatings can be formulated to withstand low temperatures without cracking, flaking, or hazing.

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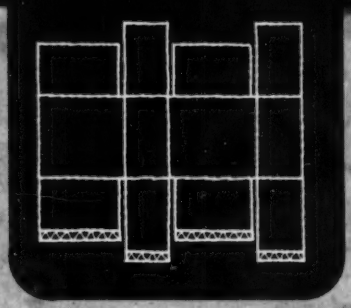
Low-molecular-weight polymers that improve a wide variety of industrial products and processes

Epolene polyolefin resins are chemical polymers whose physical properties are intermediate between those of paraffins and plastic-grade polyolefins. Their molecular weights range from 1500 to 10,000. Like waxes, Epolene resins can be melted and blended with many natural and synthetic materials, paraffins, and other resins. Yet, the physical properties of Epolene resins are superior to most waxes—they are tough, flexible, and chemically inert.

Epolene resins, singly or in combinations, contribute to improved performance in decorative moisture- and grease-resistant coatings for a variety of paper and paperboard products. They provide maximum toughness and durability in floor polish formulations. Hot-melt adhesive and laminating formulations based on Epolene resins provide strong, quick-setting bonds between such diverse materials as aluminum foil; all types of paper; and cellulose acetate, polyethylene, and polyester films. In textile emulsion finishes, Epolene resins improve the tear resistance, hand, and abrasion resistance of fabrics.

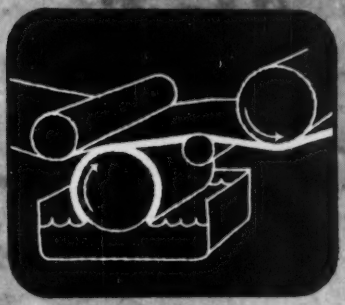
In these applications and in many other industrial processes and products, Epolene resins provide the means for improved performance and usefulness.

As indicated in the Tables, the basic types of Epolene resins vary in characteristics as their molecular weights or densities approach those of paraffin or a plastic-grade material. Some idea may be obtained from these Tables as to which Epolene resin will prove most suitable for your particular product or process. For more detailed information, and for technical assistance in selecting and using Epolene polyolefin resins, write EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.



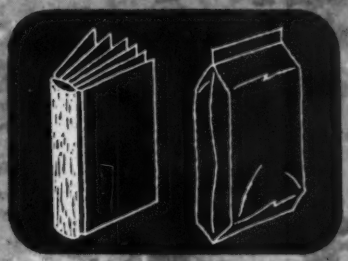
Corrugated Board Coatings

Hot-melt Epolene coatings specifically developed for use in high-speed curtain coating machines provide web or die-cut paperboard with a barrier against moisture and grease, and are highly resistant to abrasion. These clear, high-gloss coatings give a smooth, attractive finish that can be applied economically.



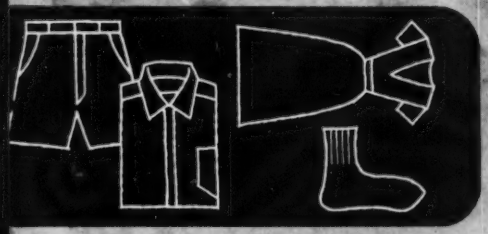
Paper Coatings

Hot-melt Epolene coatings applied by roll coating techniques on foil, parchment, kraft, glassine, chipboard, and most other paper stocks give these packaging materials an attractive gloss plus a high degree of moisture resistance and grease resistance. Such coatings can be formulated to make them readily heat sealable.



Hot-melt Adhesives

Economical hot-melt adhesives are formulated with Epolene resins for a wide variety of high-speed packaging and sealing operations. Applications include bookbinding, labels, and lamination of foil, paper, and plastic film.



Textile Finishes

Used primarily to improve the hand and drape of resin-treated wash-and-wear fabrics, Epolene emulsion softeners also significantly improve the tear strength and abrasion resistance of the fabric.

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Other Applications

There are many other applications for Epolene resins. Some are still under development, others are being tested and evaluated in processes and products. Please write for specific information in the area in which you are especially interested.

Emulsifiable Epolene Resins

wax-like properties ← → plastic-like properties

Effect of Molecular Weight on Viscosity

TYPE	E-14	E-11	E-12	E-10
Molecular Weight	1400	1500	1500	2500
Viscosity at 125°C., cps. (Brookfield)	300	375	410	2000

Effect of Density on Hardness and Tensile Strength

TYPE	E-14	E-11	E-10	E-12
Density	0.935	0.938	0.940	0.950
Penetration Hardness (100g./5 sec./77°F.)	3.5	2.5	2.0	1.5
Tensile Strength, psi	430	510	1300[a]	530

Non-Emulsifiable Epolene Resins

wax-like properties ← → plastic-like properties

Effect of Molecular Weight on Viscosity

TYPE	130° AMP PARAFFIN	N-12	N-11	N-10	C-12	C-10	C-11	TENITE 810[b]
Molecular Weight	325	1500	1500	2500	3700	7000	10,000	38,000
Viscosity at 125°C., cps. (Brookfield)	3	364	390	1990	900[c]	14,300	>25,000	>100,000

Effect of Density on Hardness and Tensile Strength

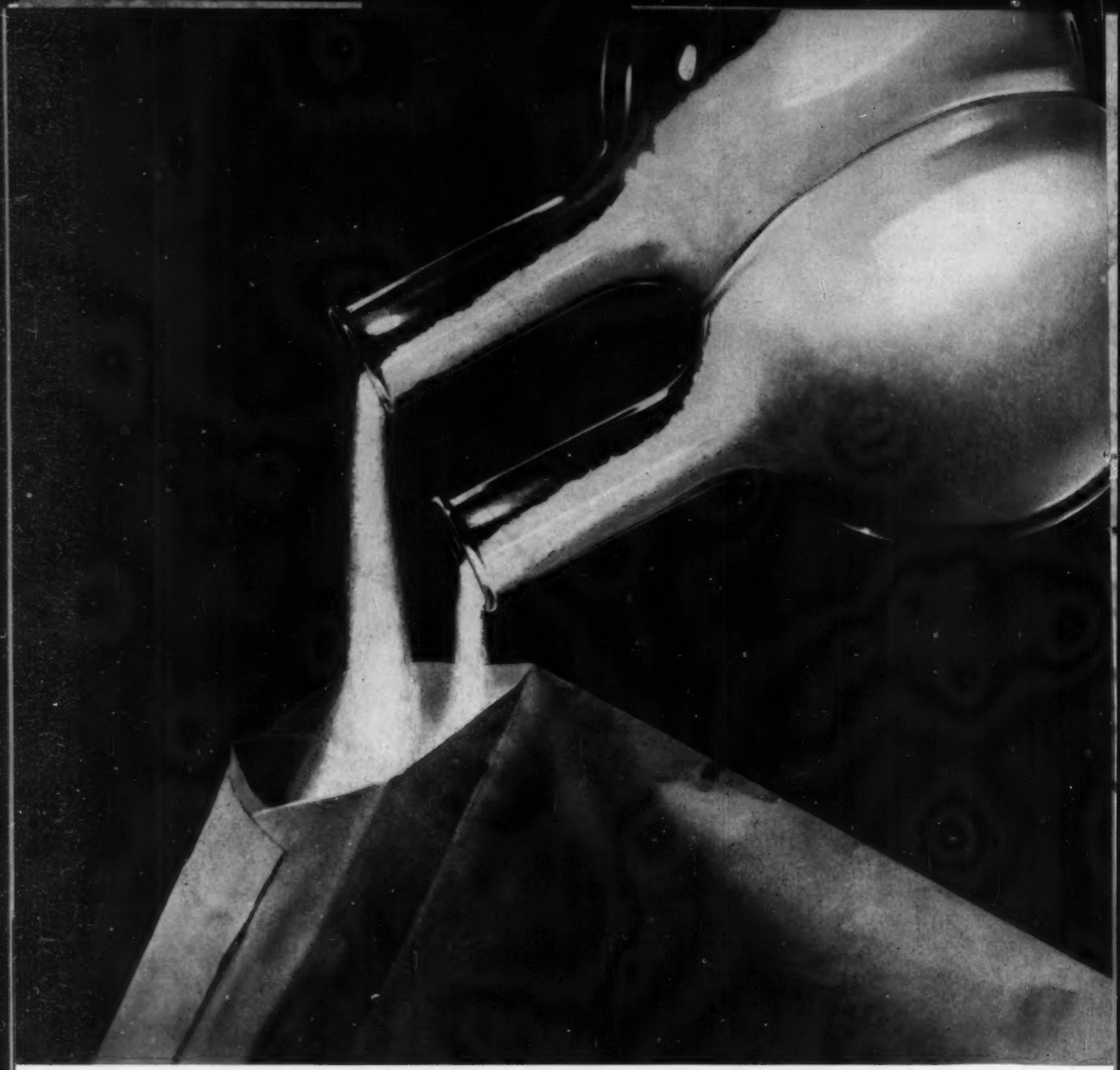
TYPE	130° AMP PARAFFIN	C-12	C-10	N-11	N-10	N-12	C-11	TENITE 3300[d]
Density	0.850	0.897	0.906	0.925	0.927	0.937	0.947	0.960
Penetration Hardness (100g./5 sec./77°F.)	15	11.5	2.5	2.0	1.5	1.5	<1	<1
Tensile Strength, psi	180	200	730	550	920	brittle[e]	1700	4000

a. Tensile strength is higher than density alone would indicate because of a higher molecular weight. **b.** An Eastman plastic-grade polyethylene. **c.** Chain-branching in this polymer reduces viscosity below that of more linear polymers, even at higher molecular weight. **d.** An Eastman high-density plastic-grade polyethylene. **e.** Too brittle to prepare film.

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Boston; Buffalo; Chicago; Cincinnati; Cleveland; Detroit; Greensboro, North Carolina; Houston; Kansas City, Missouri; New York City; Philadelphia; St. Louis. **Western Sales Representative: Wilson & Geo. Meyer & Company,** San Francisco; Los Angeles; Salt Lake City; Seattle.

Epolene®

Eastman low-molecular-weight polyolefin resins



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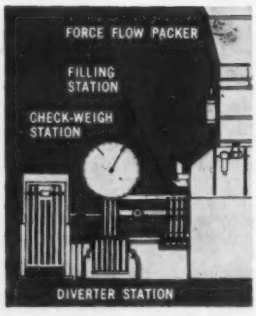
The St. Regis H. B. D. U. automatically takes the bag off the packer. While it is being removed, the operator puts on a new bag and starts the filling cycle. To make his job even easier, the unit then transfers the filled bag to the conveyor belt. This unit also provides accurate, automatic check-weighing with easy weight correction.

The H. B. D. U. is another example of St. Regis *Packaging-in-Depth*. This complete service assures you of the *right* bag, the *right* machinery to pack it, plus the services of skilled engineers. To meet your *future* needs, it includes research to develop improved packaging methods and economies.



PACKAGING-IN-DEPTH BY St.Regis BAG DIVISION

In Canada, contact St. Regis Consolidated Packaging Co., Ltd. PAPER COMPANY

Call on Socony Mobil's C. H. Lechthaler begins data-conscious day for Hercules' Doyle (turn page).

Data Opens Door to Resin Sales

For Hercules Powder's Richard Doyle (photo, above), a salesman specializing in the company's Penton chlorinated polyether plastics, the old-fashioned sales call is only a small part of the day's work. Doyle, who operates out of the company's Wilmington, Del., headquarters, spends a large part of his time finding, classifying and transmitting exact technological data on his product's performance. Backing Doyle and his resin-selling colleagues is a new data-processing system that helps forge this information into strong sales tools.

Penton, like other resins, presents its own special set of selling problems. It is finding its biggest use in the form of Penton-clad steel for process equipment in which corrosion problems are severe. From the beginning, therefore, the marketing scheme for this product has relied heavily on the presentation of performance data to equipment design engineers.

But Hercules quickly found that its technically trained salesmen were funneling in the facts faster than the company could absorb them. It had thousands of data sheets and other pieces of information about Penton's performance in the field, but it couldn't always get these to its salesmen in useful form.

The accumulation of case histories, for example, was filed according to the process in which the plastic was used. But this didn't begin to cover all the variables involved. Consequently much useful information was being "lost," simply because Hercules people couldn't keep in mind what sets of variables might be found in which process.

Card Solution: Hercules broke out what it considered the major facts about each of the case histories it had assembled, punched these into IBM cards according to the following classifications: chemicals and combinations of chemicals (each compound indexed separately) to which the plastic was exposed; concentration; temperature; pressure; characteristics of the plastic (including color and stabilizer); length of time the plastic had been in service; and—how well it performed. Also included: names of the fabricator and the purchaser of the installation.

Aside from more than 1,000 case histories gathered in the field, information from years of laboratory work was punched into cards. Thus, when a salesman (either Hercules' or a fabricator's) runs into a problem, he can Teletype Wilmington, quickly get back a sheet giving all data available on the subject. This information can be regarded from the point of view of any of the variables included. Later, Hercules hopes to provide its Penton salesmen with a complete file to be updated periodically, with the facts indexed in several ways.

Gathering Technical Data Now Fills Big Part of Plastic Salesman's Day

In Wilmington, Socony data are filed on IBM cards while Doyle quizzes National Vulcanized Fibre's

Continuing Collection: The company particularly hopes to be able to collect data from the fabricators. This information along with what it gets itself, will then be made available to all fabricators.

Another selling tool that is being drawn from the data is a series of booklets telling what a particular industry would want to know about Penton-steel process equipment.

Industry Challenge: The Buyer's Market

Hercules' Penton selling effort reflects the pressure of doing business in today's buyer's market. The sale often goes to the company with the best applications data. Competition is rough, and resin producers have found that poorly proved applications are easily lost—either to another resin, or what is worse in their eyes, to wood or metal. That this lesson has been learned is seen in the care being given to auto makers.

This market is important not only because it is large (according to some projections there'll be 400 million lbs. of plastic used here by '65) but because "tough-buyer" Detroit is closely watched by other potential plastics customers. Whether what is good for General Motors is good for the country or not, the average plastics fabricator might figure it is good for him.

Resin makers therefore give this market special attention. Probably none has done more than Du Pont, which has a special automotive market development group in the automobile capital.

Under the leadership of John Young, this unit's purpose is to get automotive engineers and executives to think of plastics as engineering materials, and to make sure that they are properly used.

The term, "engineering material," is the catchword of the new plastics selling movement. It is evidence of the emphasis that producers have been putting on each resin's special design advantages. The plastic chosen, it's hoped, will be elected because it is the best for the job—not because it is a cheap substitute for something better.

Twenty-two years ago Du Pont put one man in Detroit to sell plastics to the automotive industry. After World War II, however, the use of plastics in the favored "engineering" function began to grow. Du Pont relied on processors and their salesmen until about five years ago. Then, it decided full development of the automotive market demanded attention by the resin producer. It set up its own market development group, staffed to handle the many materials available, and increasing complexities of design.

Du Pont now has a four-man group assigned to the auto industry. Three are engineers, the other a Ph.D. in chemistry with an engineering background. In what Du Pont Manager of Automotive Development Young calls "a missionary effort," the four have developed a liaison with automotive engineering departments, purchasing agents, materials men and management people.

A deliberate program to make themselves known to engineering groups was begun and the four kept themselves constantly available for consultation. They built a mailing list of key plastics people and sent them

Thomas Leary on Penton use. Next, at Hercules, he searches flow sheet for Penton jobs.

a magazine called *Autoplastic News*, compiled a complete reference handbook called "Designing with Du Pont Plastics," and offered additional reference pamphlets. Further, the company advertises extensively in automotive trade publications, sends special technical letters to those on its mailing list, and participates in trade shows; all this is to build a personal long-term relationship with auto people.

Push One at a Time: The group, having established itself as "in" with Detroit engineering circles, follows up with specific plastic pushes. About two years ago, for example, some plastic engineering projects at one of the big-three auto companies were stymied by a decidedly anti-plastics feeling on the part of several key executives. To counter this, the Du Pont group put on a program demonstrating that a switch to plastics in one component (e.g., an instrument cluster) could save up to $45 million.

Management consultants were also brought in at this time to explain profit values in plastics to the auto company executives.

Du Pont backs up the Detroit group with a design consultant and a cost analysis group in Wilmington. One of the first considerations given to a plastics project by a motor car company—as well as by most other customers—is cost.

The cost analysts come up with approximate figures (at early stages it is impossible to be specific) and if these figures warrant continuation of the project, auto engineers work with Du Pont in completing the design. Cost is checked again, and unless there is a reduction in cost or a significant boost in reliability and performance, chances are the industry won't be interested in switching materials.

Selling in Two Fronts: In Detroit, marketers of plastics to automobile companies serve two masters—the auto manufacturer and the fabricator. Ford fabricates only about 10% of the plastics it uses in its cars, Chrysler fabricates none, and General Motors about 50%. The rest is purchased from custom molders.

Thus, the plastics market development groups must, aside from making sure the plastic is right for the application and that the part is designed correctly, follow through and see that it is properly molded. This occasionally is a challenge to the resin maker's persuasive powers.

The resin maker helps the fabricator by giving him technical advice, but still must help him make a satisfactory profit. Du Pont and other plastics producers know that there is still a tendency for many auto people to distrust plastic. As soon as a flaw develops in a plastic component auto makers will immediately want to go back to metal.

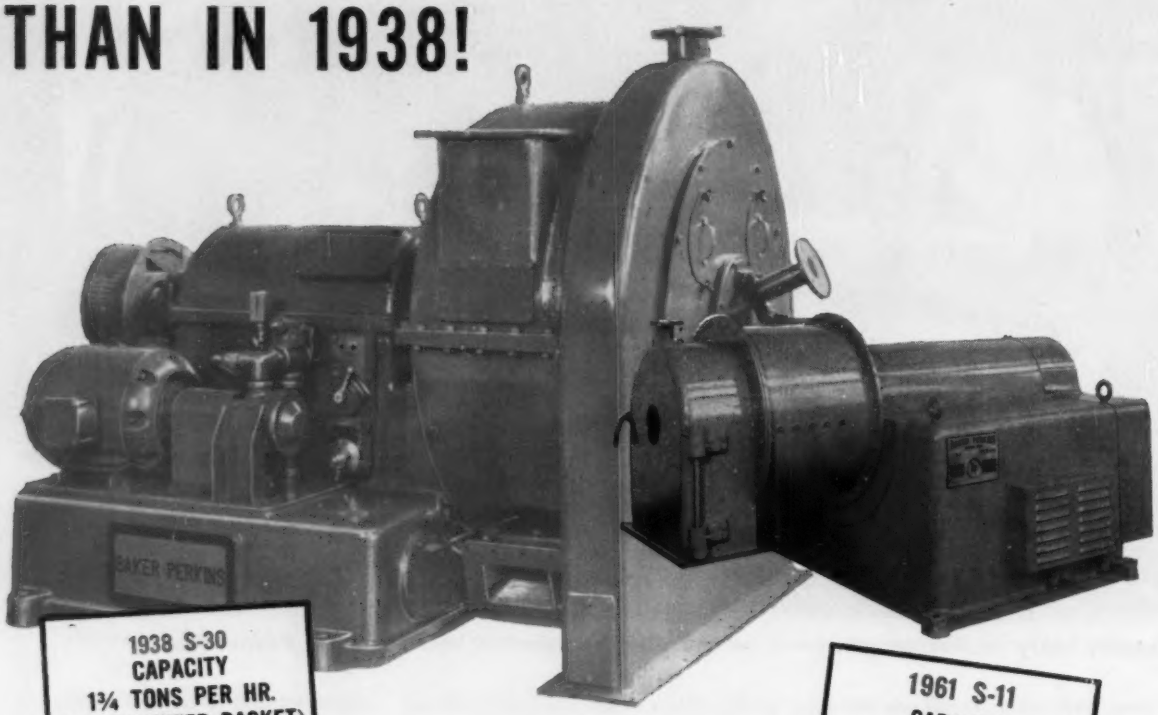
Generally, Detroit plastics sellers don't feel they can afford the ill feeling—and responsibility—of telling a manufacturer which fabricator to use.

Fabricators Prime Position: Even when broad, major markets (such as the industrial one for a plastic, e.g., Penton, and the general automotive market) are not at stake, there is a need to get close to the ultimate consumer.

And here the fabricator calls the tune—at least so far as the resin producer is immediately concerned.

The fabricator deals directly with

B-P CENTRIFUGALS COST NO MORE TODAY PER TON OF CAPACITY THAN IN 1938!



1938 S-30
CAPACITY
1¾ TONS PER HR.
(30″ DIAMETER BASKET)

1961 S-11
CAPACITY
5¼ TONS PER HR.
(11″ DIAMETER BASKET)

Chemical processing equipment costs have risen tremendously in the last 23 years yet the price of the new B-P S-11 centrifugal-based on the capacity in tons per hour—is the same as it was way back in 1938! Compare the two machines above . . . the new S-11, while much smaller than the old S-30, discharges 3 times as much dried solids.

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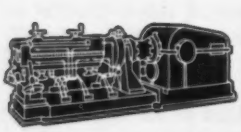

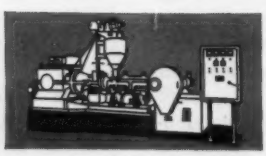

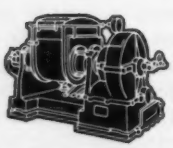

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410

SAGINAW, MICHIGAN

the ultimate consumer. Another reason: Plastics makers no longer have a hard-to-get product on their hands. In the early days of the plastics boom a resin maker had to tell fabricators how to mold—they hadn't developed their own experience. In addition, resin makers could pretty much set their own selling terms—it was a sellers' market.

This era, according to many, has left several bad legacies that make selling plastics more difficult and less profitable than it might be. These holdovers have been particularly hard on small, young firms such as Pantasote Co. (New York).

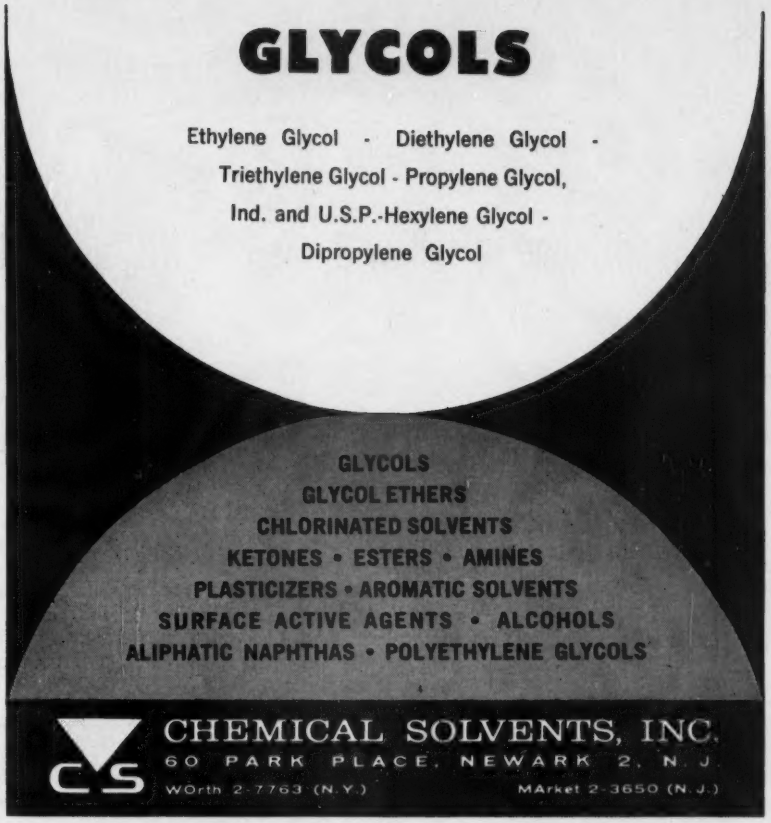
That company's chairman, Charles Wyman, says, "the big chemical companies had it too easy, so they never learned to develop real marketing organizations, real salesmen; they were just order takers. When it became necessary to *sell*, all they did was cut prices."

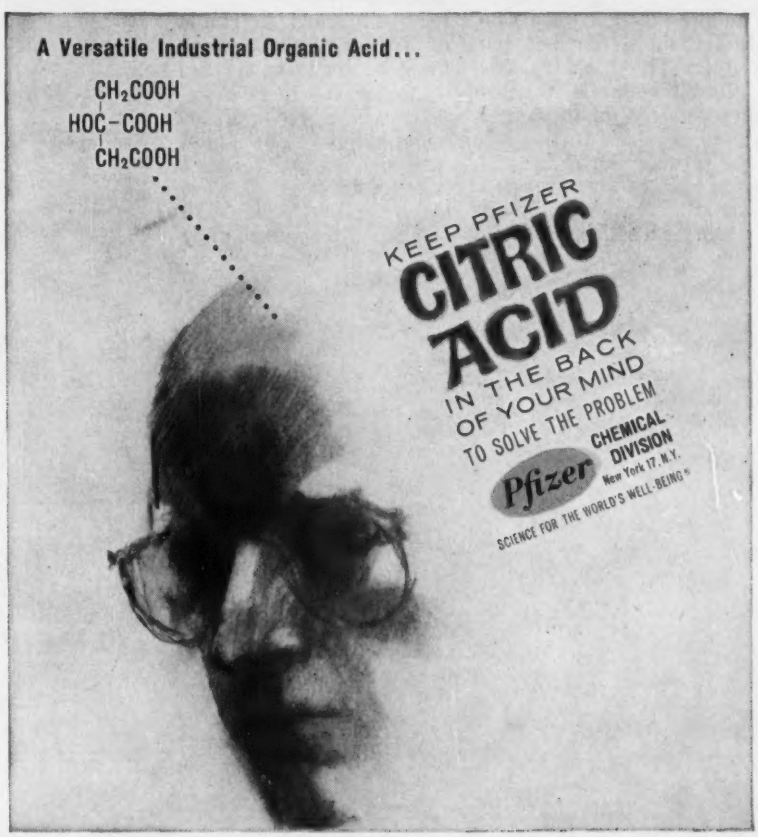
Service Specialists: Pantasote is one of many smaller companies that are now offering extra service to customers. The aim is to supply services not offered before. But generally, these "services" boil down to closer attention to deliveries, more frequent sales calls, willingness to tailor products more closely to customers' special requirements.

But the bigger companies are also moving hard toward service emphasis, and they can count on greater resources to back them up, if needed. They have, in many cases, begun to learn more from fabricators than they are teaching them. Some fabricators of plastics have extensive engineering departments and it is no longer always necessary to simply talk to the man operating the machine.

In dealing with these larger molders, the resin makers' chief function is to suggest new products and help promote them. Dow, for example, will pay part of the advertising expense on a plastic product that it feels has particular merit.

Such market and product development work, the resin makers hope, will do much to help pull plastics out their present sluggish market state—which many industry people attribute to overconfidence. The overconfidence, if not the overcapacity, has vanished and resin makers are working hard to push the industry forward at its old, fast pace.





The importance of follow-through in NH_3 and Nitrogen Solutions purchases

by Ray Funk

About the Author. Follow-through is Ray Funk's specialty. He has been doing such work for 14 of the 23 years he has been engaged in sales work. For the last six years, Ray, as Product Distribution Coordinator, has devoted his time exclusively to customer service work on nitrogen products.

* * *

Follow-through on a sale is for the seller *not* the buyer. The ideal in this follow-through is to obviate the need for the buyer to do anything further after placing the order except to be ready to receive the shipment when it arrives. As a seller, we often go beyond the delivery responsibility by helping a customer in such matters as designing facilities for storage and handling. We may also assist him with educational programs on the safe handling of the Ammonia and Nitrogen Solutions.

But there is much more than this to sales follow-through on NH_3 and Nitrogen Solutions Sales. When we receive an order for Anhydrous Ammonia or Nitrogen Solutions, we must be ready to tell the customer at any time exactly where his shipment stands and when he should be receiving it. We must know what tank cars are available, when they will be loaded and when they will leave our siding. We must also know when the railroad who receives the car will be making it into a train. And of course, we must know the routing that will most expeditiously deliver the shipment to the customer.

This same attention to follow-through is true of truck shipments. We schedule accurately the arrival, loading and departure of truck transports from the plant; the surest route and the time of delivery. During peak Spring and Summer this is critical. To us it is important that the needs of our customers are attended to without interruption regardless of the method of delivery or seasonal peaks.

* * *

Would you like this kind of follow-through on your purchases of NH_3 and Nitrogen Solutions? Call American Oil Company.

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AMERICAN

Lowering the Boom

A new way of transporting fluids from docks and piers to tankers and barges has been given its first installation at the Whitewater Petroleum Terminal, on the Chicago Sanitary and Ship Canal at Stickney, Ill.

The device, which replaces hoses, is a hydraulically operated boom called Powered Pipe, made by Mississippi Valley Structural Steel Co. (Chicago). The boom features a system of hydraulic components that provides the flexibility required by the rise and fall, roll and pitch of the ship. According to the manufacturer, one operator, working at a control console, can do the work of three or four men working with hose connections.

The boom is light enough (it needs no counterweights) to be installed aboard tankers and barges as well as dockside.

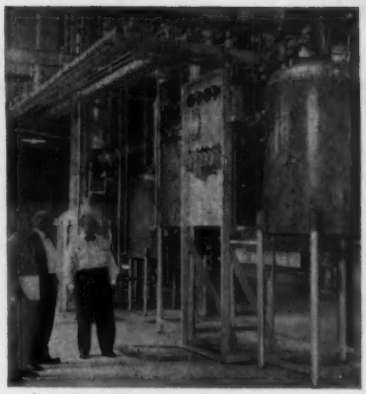
Drug Market Moves

Like McKesson & Robbins another drug wholesaler—New York's Ketchum & Co.—has entered drug manufacture (*CW, Oct. 21, p. 37*). Unlike McKesson & Robbins, however, Ketchum will not make a broad line of generically named, cut-rate drugs. It is starting with a proprietary antiblemish skin cleanser called Propa-PH, plans later to add other proprietary and pharmaceutical products.

Ketchum, which calls itself the nation's fourth-largest drug wholesaler, will manufacture through a wholly owned subsidiary, Bio Products, Inc. It will "fair trade" its products, and will distribute them on a franchise basis through selected wholesalers (including five competing wholesalers in the New York City area). The products will be sold only through drugstores, which will get a 20% discount plus 2% cash. Wholesalers will get a $10 line extension, more than three times the New York metropolitan area average for '60.

The company says that it will make only newly formulated products, not duplicates of existing ones. It is also looking for existing lines of proprietaries and ethicals that it might acquire.

In another drug wholesaling development, The Upjohn Co. (Kalamazoo, Mich.) says it will cancel this week all agency agreements with wholesalers.



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Sealed Bid Opening was:
October 15, 1961, 3:00 P.M.
Sealed Bid Opening changed to:
November 22, 1961, 3:00 P.M.
GSA UDS-9-LB-2, N-Nev. 415
General Services Administration
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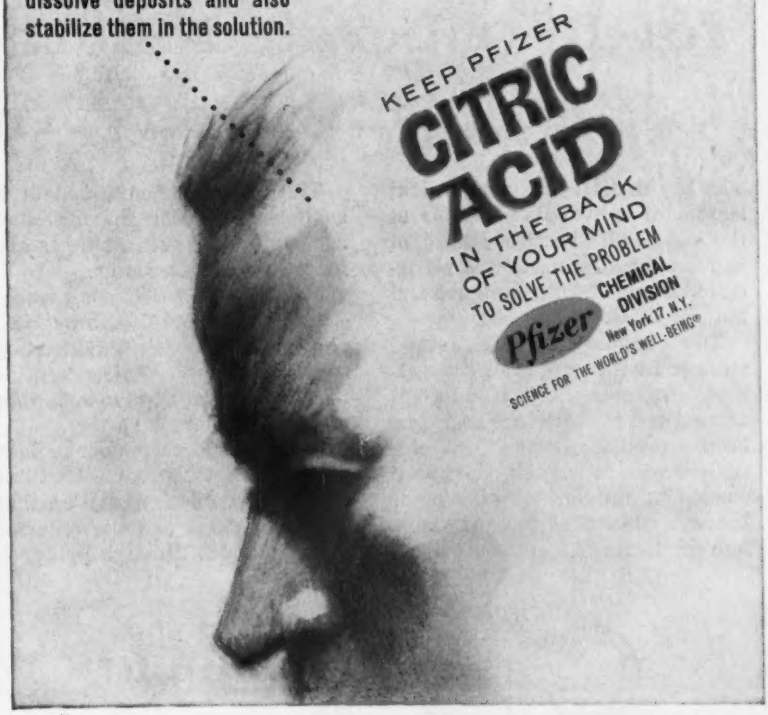
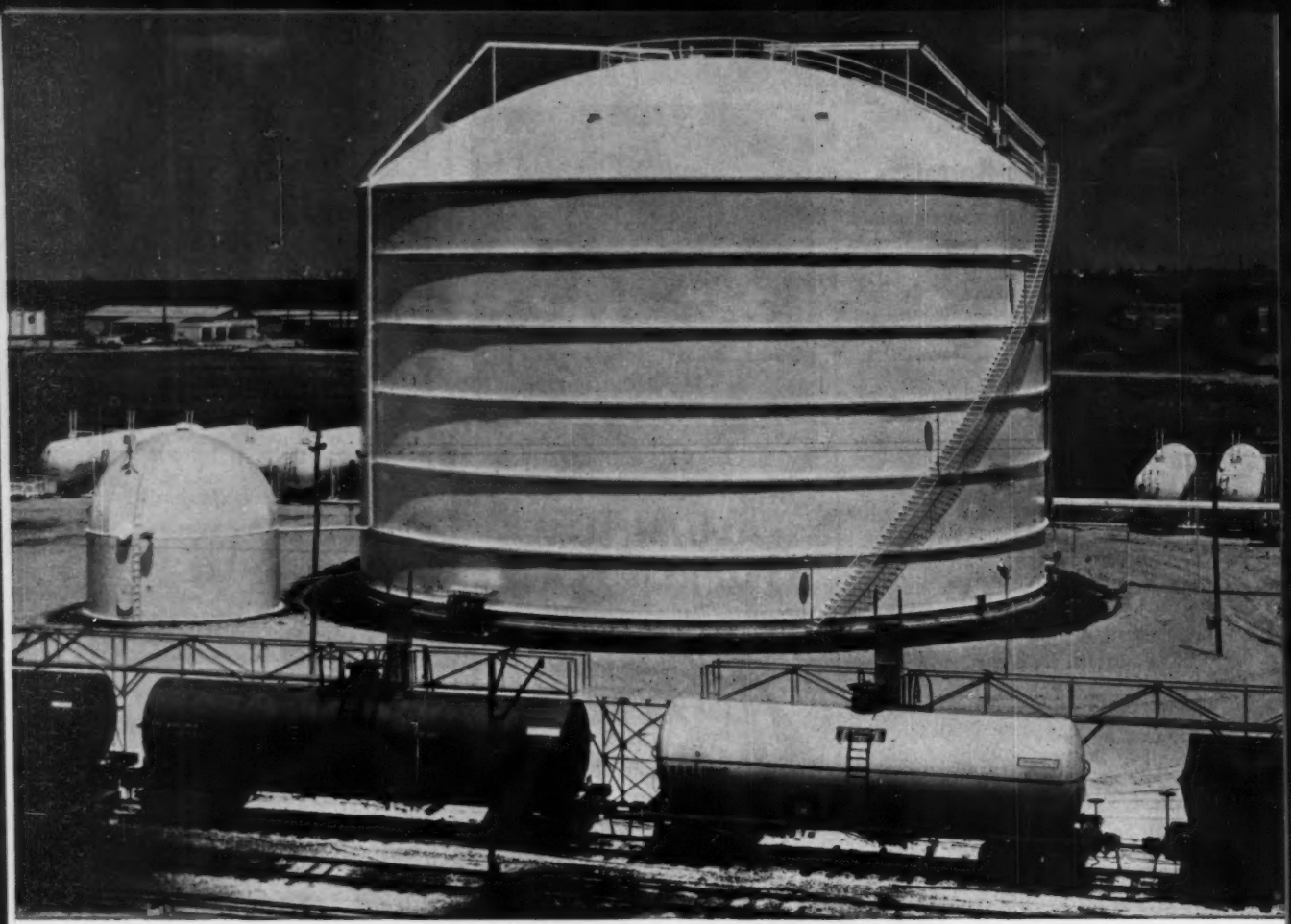
An excellent sequesterant ... to inactivate troublesome metallic ions...to chemically dissolve deposits and also stabilize them in the solution.





Another Cost-Saving Triumph for Refrigerated Storage of Anhydrous Ammonia

The key to efficient, economical storage of anhydrous ammonia at the Mid-South Chemical Co., plant in Memphis, Tenn., is this refrigerated storage facility designed and built by CB&I.

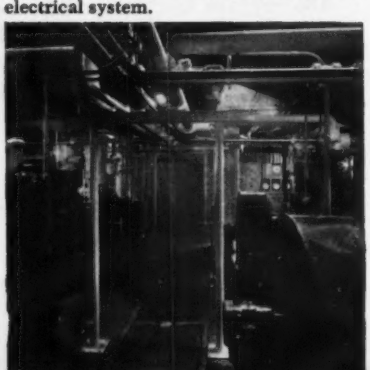
The economy of refrigerated storage facilities operating at atmospheric pressure (including operating and maintenance cost) has been proved many times in comparison with conventional pressure storage at ambient temperatures. Inherent safety features are built into the facilities.

This same economic benefit is available for "peak shaving" storage of liquefied petroleum gas and for gas production plants.

Single Responsibility is assured —from initial planning through all phases of designing, engineering, fabricating and constructing— when you choose CB&I to build your refrigerated storage facility.

As the leading designer of low-temperature storage facilities, CB&I has considerable information that can be of value to you. Write for Bulletin G-48. Chicago Bridge & Iron Company, 332 S. Michigan Ave., Chicago 4, Ill. Offices and subsidiaries throughout the world.

The heart of the installation is a 106 ft. dia. double-wall insulated steel tank which stores 9,560 tons (80,000 bbls. water capacity) of anhydrous ammonia at about –27°F. and 0.5 psig. Conventional storage at ambient temperatures would require 136 high-pressure 30,000 gallon blimps. Control is automatic — provided by a combination pneumatic-electrical system.



CB&I **built it!**

CB-6126

These agreements allow wholesalers to take goods on consignment, returning those not sold. From now on, all dealings with wholesalers will be direct sales, with the wholesaler taking title.

Upjohn says it was one of the last drug houses dealing on the consignment basis, and that it is simply following what has become the practice of the industry. The company's officials state that the decision had nothing to do with the McKesson & Robbins move into drug manufacturing, which angered many drugmakers.

DATA DIGEST

- **Accounting:** The third edition, revised and expanded, of the Society of the Plastics Industry Accounting Manual, has been issued. The previous edition was printed nine years ago. The 200-page book contains reference materials on sales analysis, financial statements, fringe benefits, depreciation rates, conditions of sale terms, cost formulas, procedures for liquidating overhead, insurance, budgets, and other financial and accounting data. Volumes are available at $15 from SPI (250 Park Ave., New York 15).
- **Epoxy Chemicals:** A four-page data sheet on epoxy chemicals is available from Heyden Newport Chemical Corp. (342 Madison Ave., New York 17). The booklet describes liquid polyamides, anhydride curing agents, and a viscosity modifier.
- **Polyethylene:** A bulletin just published by Eastman Chemical Products, Inc. (260 Madison Ave., New York 16) describes the physical properties and principal industrial applications of its line of low-density polyethylene resins. The bulletin tabulates property data and uses for 12 types of emulsifiable and nonemulsifiable resins.
- **Vinyl:** A 48-page manual gives data on four Celanese vinyl monomers for use in coating resins, leather finishes, adhesives, textile sizes and backings. It also offers guidance on polymerization, plus information on the preparation of homopolymers and copolymers. It is available free from Celanese Chemical Co. (522 Fifth Ave., New York 36).
- **Plating:** A four-page brochure issued by Enthone, Inc. (442 Elm St., New Haven, Conn.) describes its new line of chemical plating baths. The baths are for depositing nickel, copper or silver on a variety of substrates without electric current. In addition, it

What Do You Save With Chemical Week?

TIME—It's priceless to any chemical process management man. Here in CHEMICAL WEEK are compacted your reading requirements to save you endless hours of personal research and report reading. CW faces up to your specific job problems, helps you solve them—reports latest trends and developments, both technical and non-technical—covers all the worthwhile news about your industry. If you're not a subscriber, it's yours . . . at only $3.00 for a full year's service, $5.00 for 3 years.

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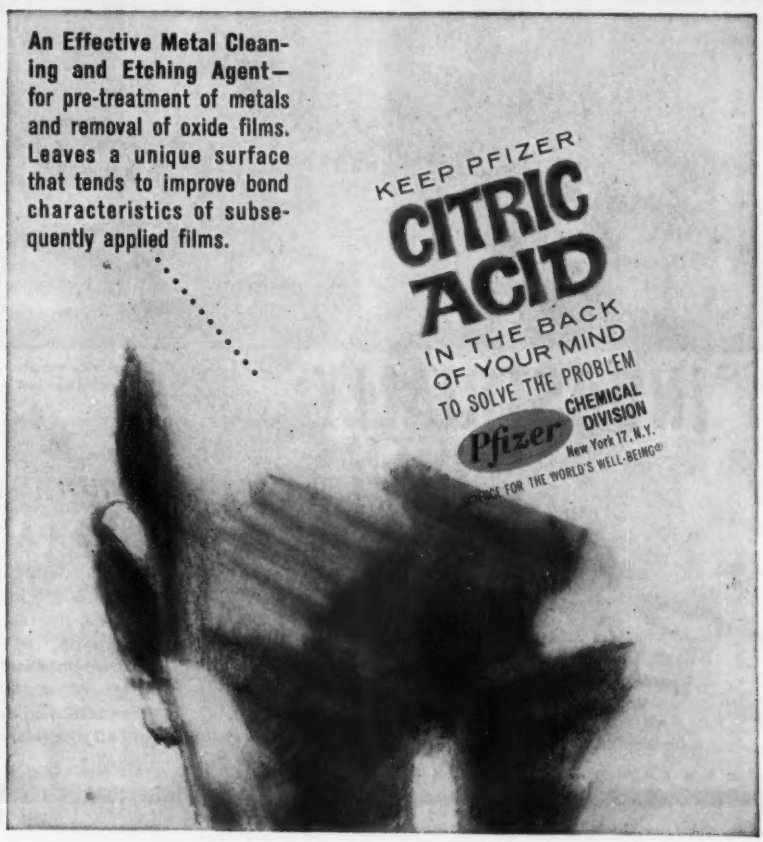

Automatic bag placing and filling . . . shown here is the Raymond Bag Packer (top half of photo) and the Raymond Bag Placer (bottom)

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Here's a proven step towards automating your packing line. The Raymond combination Bag Placer and Bag Packer will automatically hang bags on packing spout and fill them at the rate of 25 bags per minute . . . proven in full production line operation. The development of the Raymond Bag Placer, which is designed to operate with all open mouth packing equipment, is another step forward towards completely automatic bag placing, filling and closing operations. For details on the Raymond Packer Placer combination or separate units, contact your nearest Raymond Representative or write

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contains a brief explanation of chemical plating.

• **Silicone Rubber:** A 60-page book titled "Uses and Abuses of Silicone Rubber" describes many aspects of this material. It is designed to be used by the professional and the layman and contains silicone rubber specifications and data, definitions of many commonly used but often misunderstood terms in the field. It is available from Mechanical Rubber Products Co. (Warwick, N.Y.).

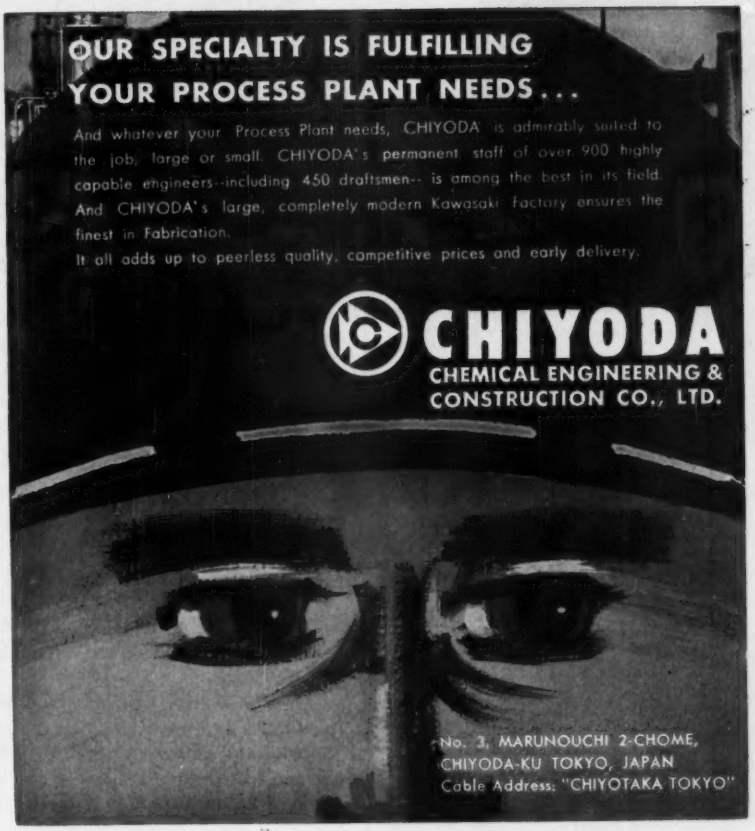
• **Distillates:** A three-page bulletin, "Current Topics #150," details food applications of fully refined, light hydrocarbon distillates. It is available from the White Oil Division, Sonneborn Chemical and Refining Corp. (300 Park Ave. South, New York). Among applications discussed: insecticides for food areas, defoaming agents, compounded oils, and forth flotation mixtures.

• **Paint Thickener:** A three-page data sheet describes the use of Attagel 20 and Attagel 30 (colloidal forms of the mineral attapulgite) as thickeners for emulsion paints. The sheet tells how to use the thickeners where high-shear equipment is not available, and how to determine how much to use and how to get even dispersion. It is available from Minerals & Chemicals Philipp Corp., Menlo Park, N.J.

• **Plastic:** Tayloron PA, a new high-temperature, asbestos-base reinforced plastic designed for rocket applications is described in a bulletin published by Taylor Fibre Co., Norristown, Pa. The bulletin gives the material's general and thermal properties, plus sizes for the various available forms.

• **Containers:** Container collapse problems and suggested solutions are given in a new brochure issued by W. R. Grace & Co.'s Polymer Chemicals Division. Brochure describes the effects of permeation, swelling, product instability to oxygen and light, solution of gases into product and hot filling. Information is presented in three sections, covering causes of dimpling, methods of distinguishing between causes, and eliminating and reducing causes of dimpling.

• **Glass:** Arsenic trisulfide glass is described in a 4-page folder issued by Servo Corp. of America (111 New South Road, Hicksville, L.I., N.Y.). The folder describes the glass's optical chemical, physical and thermal pro-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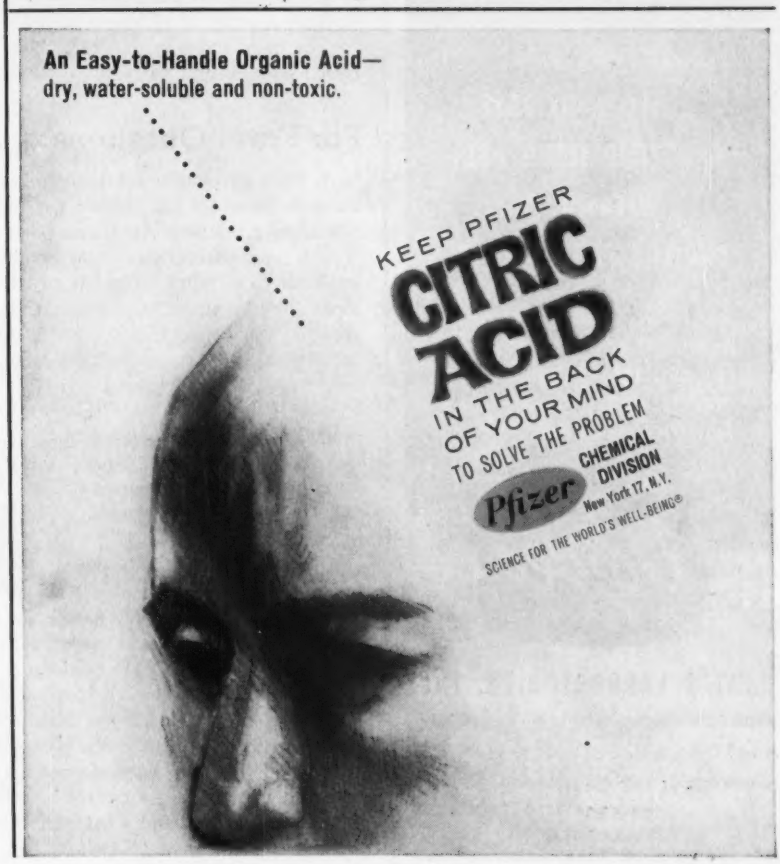

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perties, covers available special reflection-reducing coatings, and gives typical transmission and refraction indices.

• **Linings:** A test chart manual for container linings is available from Bradley & Vrooman Co. (2629 South Dearborn St., Chicago 16). The 49-page book gives tables for seven series of linings which list the product, chemical composition, thickness, and performance under exposure conditions ranging from 30 to 360 days. The manual also describes a number of test methods.

• **Packaging:** An 8-page booklet issued by Union Carbide Development Co. (270 Park Ave., New York 17) describes skin packaging for industrial and consumer items. It explains the process, also carries brief case histories giving several applications. Illustrated are the steps used in applying the skin.

• **Vinyl:** The use of vinyl emulsions in paints is discussed in a 24-page brochure newly issued by Air Reduction Chemical & Carbide Co., a division of Air Reduction Co. (New York). The brochure suggests paint formulations, replaces a series of technical bulletins for the paint industry that have been issued over several years.

For Farm Questions

A farm consumer panel compiled through the years for its own use by Theodore Riedeburg Associates (New York), consultants, is being made available to industry. The list covers three broad categories, each having about 2,500 names. Included: tobacco farmers, cotton farmers and vegetable farmers. The last-named list is subclassified according to the entrepreneur, the contract farmer (who follows directions of a major buyer), and the vertically integrated farmer (who does everything up to final packing and shipping).

The list is indexed to permit the selection of specilized panels based on income, amount of acreage, specific crops, types of products used, etc. Members of the panel are paid on a premium basis, similar to payment to other consumer panels.

Riedeburg will handle the actual mailings. Prices will vary, depending upon whether mailings or diary interviews are involved, and what part of the list is used.

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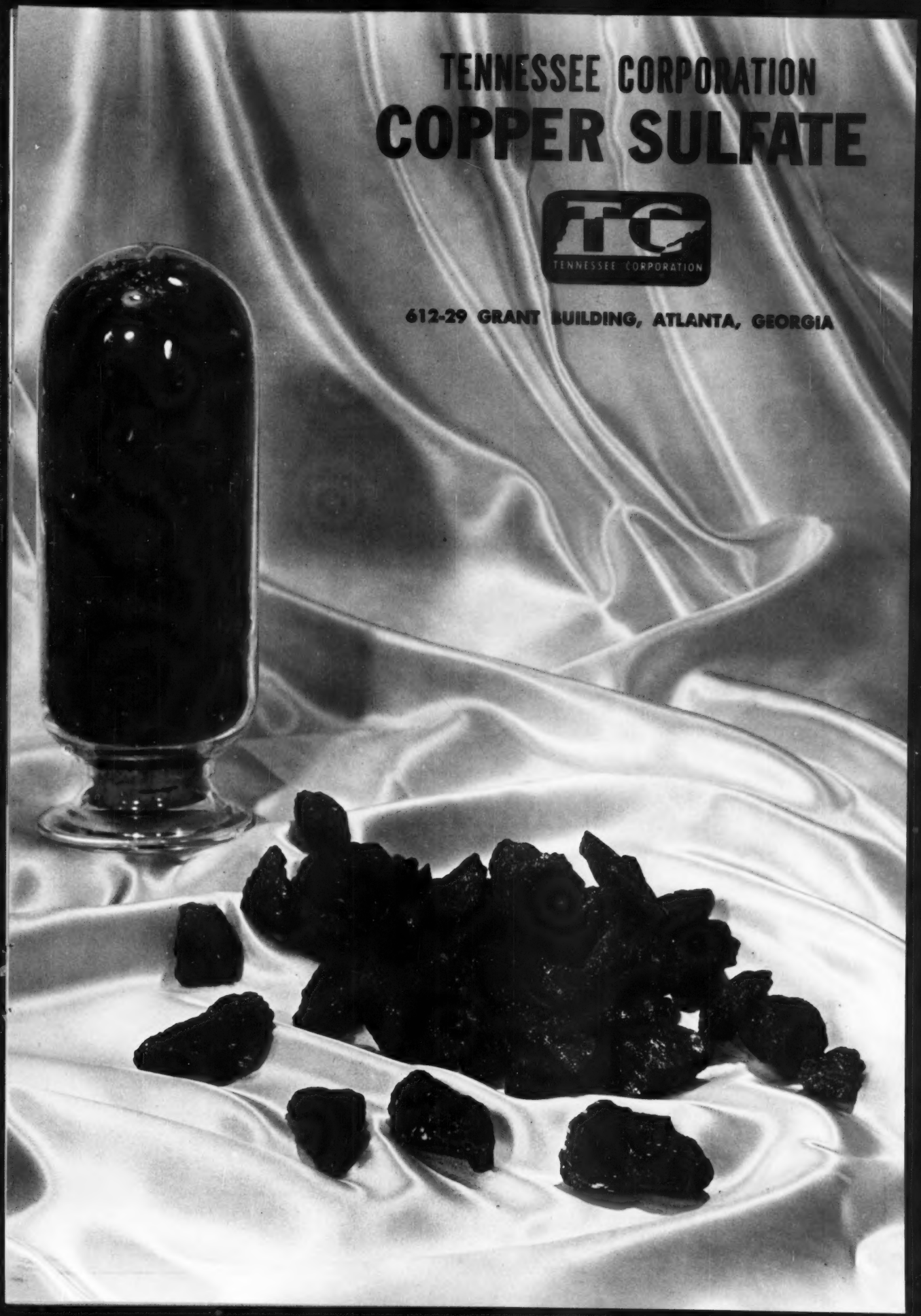
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Market Newsletter

CHEMICAL WEEK
November 4, 1961

Recurring predictions of a coming potash glut were challenged last week by President Thomas Ware of International Minerals & Chemical Corp. Ware told company stockholders, meeting in New York (*see p. 45*), that such pessimistic views are apparently based on a comparison of forthcoming increased productive capacity vs. expected domestic demands.

The new mines of IMC, Texas Gulf Sulphur and Potash Co. of America will, he observed, provide a capacity "cushion" of 13-14% above demand expected between '63 and '67. After that, he said, excess capacity will drop to 4%, and demand will exceed supply—as it does now.

Ware contends that forecasters often overlook the growing export market, which will "bite biggest" into increased North American potash production. Export potash sales are likely to increase from 10% of total production now to 20% of total (increased) output in '68.

•

That 1¢/lb. polystyrene price increase is still not firm, despite producers' efforts to justify it (*CW Market Newsletter, Oct. 14*). But they will try again Dec. 9—the next "effective date" selected by Dow, and the date that others will also presumably adopt.

But there's no shortage of polystyrene. And two producers—Koppers and Foster Grant—haven't joined the price-hiking majority. Some resin market observers think there will be no settling down until these two firms decide definitely one way or another. If either goes along with the hike in December, it would leave the other in the position of casting the "deciding vote"—which may not set well with some customers. Right now it looks as if the stalemate could drag on into '62.

•

Phthalate ester producers cut prices last week as anticipated (*CW Market Newsletter, Oct. 28*), although some marketers had "hoped ester prices would not follow phthalic anhydride price cuts this time." Nevertheless, the historic pattern was followed—Allied, Union Carbide and Monsanto posted cuts ranging from ¾¢ to 1½¢/lb.

Typical changes in Eastern territories, freight allowed (effective Oct. 20): 1¢/lb. reductions brought dioctyl phthalate and diisooctyl phthalate down to 22½¢/lb., butyl 2-ethylhexyl phthalate to 22¢/lb., and diisodecyl phthalate and 2-ethylhexyl isodecyl phthalate to 23¢/lb. Dibutyl phthalate dropped from 28¢ to 26¾¢/lb. and ditridecyl phthalate went from 27½¢ to 26¾¢/lb.

•

Naugatuck Chemicals (Canada) is pushing for a tariff against imports of herbicides—specifically 2,4-D and 2,4,5-T—made in the U.S. The firm, a division of Dominion Rubber, wants the Canadian government to impose a duty of 15% (British Commonwealth preferred) and 20% (most favored nation) on these materials as well as a tariff hike on MCP herbicide (2-methyl, 4-chlorophenoxyacetic acid).

Market Newsletter

(Continued)

Naugatuck, now the only Canadian producer of 2,4-D, is worried about imports because they amounted to about 4 million lbs. in '60, even though the list price of 2,4-D in Canada is 34½¢/lb., compared with 40-45¢/lb. for U.S.-made 2,4-D.

The only reason, say Canadian sources, why U.S. herbicide sellers haven't been hauled before Canada's Dept. of National Revenue on dumping charges is because list prices are meaningless. The 2,4-D herbicide is actually being sold at 32-37¢/lb. (perhaps lower) and prices on material moving into Canada are on the low end of the price scale.

But there are other reasons for heavy herbicide imports into Canada. The large volume in '60 was partly due to failure of Naugatuck to get its Edmonton plant onstream in time to produce for the '61 season. But even with the Edmonton plant operating, imports may continue. Reason: a new Interprovincial Co-op plant at Saskatoon probably won't be ready for next season. Aso, Interprovincial is a formulator, may not want to depend on Naugatuck for its total supply. Dow is a major marketer of 2,4-D in the Prairie Provinces, and has usually provided chlorine and phenol raw materials to Naugatuck (when manufacture was all done at Elmira, Ont.). It's not certain whether the arrangement will continue. Dow makes 2,4-dichlorophenol at Edmonton and could conceivably make 2,4-D.

Meanwhile, Canadian herbicide formulators manage to sell 2,4-D and 2,4,5-T products in the U.S. despite a tariff barrier of 25% plus 3½¢/lb. Naugatuck spokesmen think this export business will increase.

•

Naugatuck attributes a 1¢/lb. price increase on vinyl plastisols (new tab, effective Nov. 1: 25¢/lb.) to increase research and development costs—the same plea polystyrene producers are trying to use (ineffectively so far) to justify higher prices of their product.

If Naugatuck wavers in its stand (in the event other producers are slow to follow suit), the price hike may not stick. Buyers are prone to cast a less sympathetic ear to plaints of higher research and developments costs than to more common explanations of higher production costs.

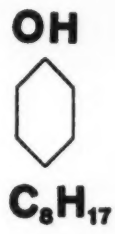
•

Two plant completions: Sinclair-Koppers hit capacity operation at its 70-million-lbs./year styrene unit at Houston, and B. F. Goodrich officially acknowledged completion of its ABS plastics (acrylonitrile-butadiene-styrene) plant at Louisville, Ky. (*CW Market Newsletter, Oct. 14*). The new plant is believed to have a capacity three times that of the firm's older plant at Akron, O. Capacity of the latter unit is estimated at 15 million lbs./year.

•

Thiourea, now an import, will be made in the U.S. when Baird Chemical's planned plant is built adjacent to its Sorbitol venture in Peoria, Ill. The unit, says Baird, will be "large enough" to supply all domestic requirements, and will stabilize thiourea price and quality.

OCTYLPHENOL



white flakes

NONYLPHENOL

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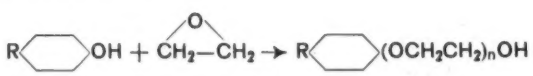
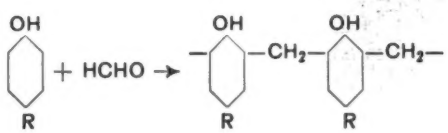
Productive alkylphenol reactions

Etherification with Ethylene Oxide. The length of the polyoxyethylene chain may be varied by controlling the amount of ethylene oxide used. Resulting products are widely used as nonionic surface-active agents.

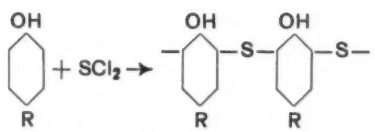


Condensation with Aldehydes. The polymers formed are oil-soluble, soft and tacky, and not thermosetting. Alkylphenols, used with phenol, can modify the properties of ordinary phenolic resins—can improve oil solubility, water resistance, electrical resistance. Possible use: oil-soluble varnishes for electrical insulation.

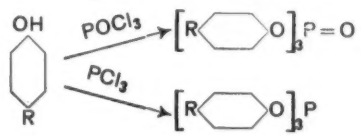


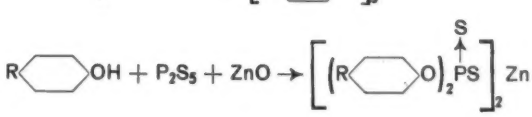
Calcium and barium salts of alkylphenol-formaldehyde polymers have been found useful as corrosion inhibitors, antioxidants, and sludge-dispersants for automotive lubricating oils.

Condensation with Sulfur Halides. Potential applications of alkaline earth metallic salts of alkylphenol/sulfur halide condensates are lubricating oil additives, rubber antioxidants, rubber vulcanization accelerators.

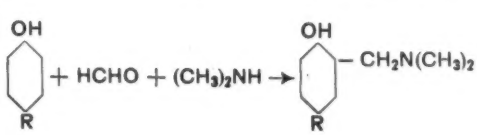


Preparation of Phosphorus Esters. Mono-, di-, and trialkylphenyl phosphates are prepared by reaction of alkylphenol with phosphorus oxychloride. Alkylphenyl phosphites are similarly made from phosphorus trichloride. Reaction with phosphorus sulfides gives various thio- and dithiophosphate esters. Potential uses: lubricating oil additives, plasticizers for cellulose esters and ethers.





Reaction with Aldehydes and Amines—Formation of Mannich Bases. Possible uses of the products formed are: accelerators and hardening agents for epoxy resins, printing ink additives, emulsifiers, corrosion inhibitors, pH stabilizers, dyestuffs.



LITERATURE AND SAMPLES
Write to Dept. SP-18 for samples and 18-page booklet with more information on reactions of alkylphenols.

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Suggested alkylphenol uses should not be understood as recommendations to violate any patents.

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Ammonia Outlook: Imbalance Until '65?

The current buildup of fertilizer ammonia capacity in the U.S. forebodes several years of rough sailing for present and prospective producers—particularly those in the Midwest.

Fertilizer ammonia producers throughout the country are deeply concerned about the current market situation. Some of these producers are certain that this year they will wind up in even worse shape than last—when there were surpluses, weak markets, tumbling prices.

The situation has created a schism between established ammonia makers and the raft of newcomers poised to start producing. The problem is particularly acute in the Midwest, where fertilizer ammonia capacity may well double over the next couple of years.

Larry Roberts, Shell's Ammonia Division general manager, sums up the position of those decrying the flood of unneeded new capacity. "Some published reports on last year's business," he says, "were rosy—but wrong. These indicated that '60 was a good season, that the ammonia business was stable."

Plants in the Midwest were reported to be running at full capacity, says Roberts, "but actually only during the peak of the season. Markets were weak, and deals could be made."

In the Southwest, ammonia is now moving for less than $70/ton, well under the $92/ton posted price. In some areas of Texas ammonia reportedly is selling at about $60—almost equal to the combined cost of manufacturing, distribution and storage.

Roberts is also convinced that "planned construction and expansions in the Midwest will cause a glut in the ammonia market," even though nitrogen consumption generally is expected to grow at a 5-10%/year rate.

Some marketers, however, go even further, anticipate use will double by '65, perhaps triple in the succeeding five-year period. This bright long-term outlook is behind the current growth of new facilities (*CW Nitrogen Report, Aug. 26, p. 33*).

Changing Picture: Here's how the planned and established plants fit into the picture in the more significant nitrogen-consuming areas:

Midwest: Much concern is voiced about the near-future prospects for nitrogen in the Midwest corn belt, particularly the Illinois-Indiana-Iowa area. Although consumption figures are not complete, these three states used an esimated 390,000 tons of nitrogen last season. Right now on the borders of these three states there are plants with capacity of about 325,000 tons/year of ammonia (equivalent to about 260,000 tons/year of nitrogen). The plants: U.S. Industrial Chemicals, Tuscola, Ill., 60,000 tons/year of anhydrous ammonia; Texaco, Lockport, Ill., 77,000 tons/year of ammonia; Armour, Crystal City, Mo., 70,000-84,000 tons/year of ammonia; and Calumet Nitrogen, Hammond, Ind., 105,000 tons/year of ammonia. And within shipping distance are other plants with a combined capacity of more than 600,000 tons/year of anhydrous ammonia.

Additional plants to be onstream by '63 will have a combined capacity of 390,000 tons/year of anhydrous ammonia (equivalent to 320,000 tons/year of nitrogen). These units: Hawkeye Chemical, Clinton, Ia., 100,000 tons/year of ammonia; California Chemical Co., Ft. Madison, Ia., 105,000 tons/year; Monsanto, Muscatine, Ia., 70,000 tons/year and a cooperattive venture in southern Illinois or Indiana, 115,000 tons/year.

Shell's Roberts: 'Planned construction in the Midwest . . will cause a glut.'

The immediate future looks gloomy. But it is well known that the corn growers—who take 80% of the nitrogen fertilizer consumed in the Midwest — use 15-20 lbs./acre of nitrogen, compared with 85 lbs./acre recommended for maximum yield. If fertilizer consumption moves toward this ideal, today's "excess" capacity will be required in six to eight years to meet demand even though government cutbacks in crop acreage continue.

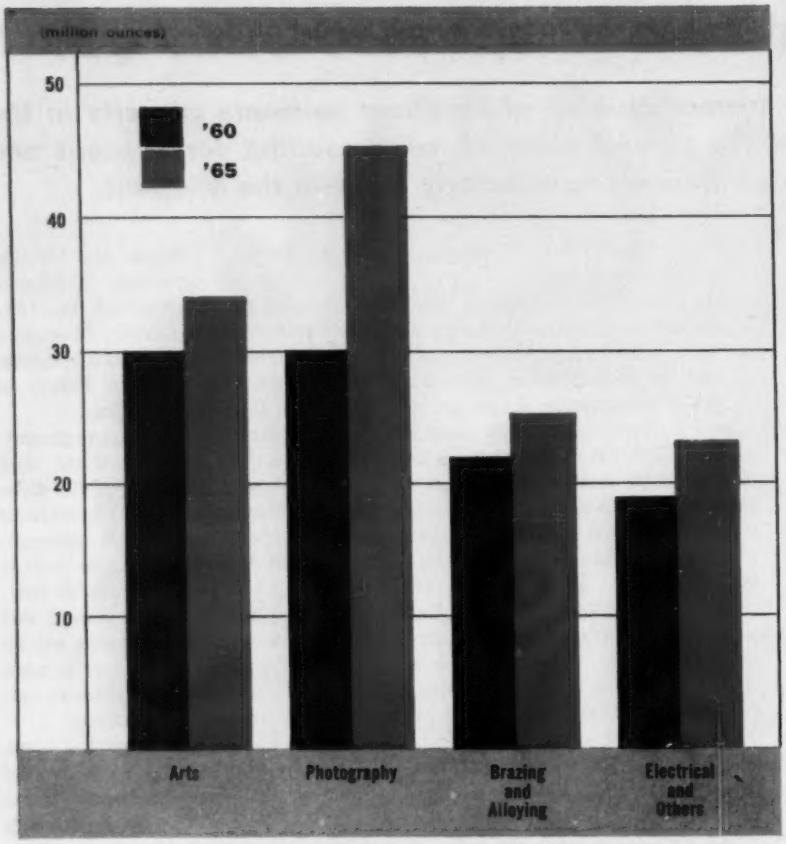
West Coast: The West has some oversupply but not as much as that developing in the Midwest. Next year's volume will be good, although there will probably be a slight falling off due to government cutbacks in wheat and cotton. Prices will probably continue as they are.

No new operations are in the offing for the West Coast.

Southwest: The sale of ammonia in the Southwest has hit a new low. Reportedly, some dealers are selling at $60/ton (it is generally felt that $56-60/ton covers manufacturing, storage and distribution costs — exclusive of profits for the manufacturer or dealer). There is a growing trend among dealers to purchase ammonia somewhat under list price from producers, then sell it at a loss to the farmer to gain his guarantee of grain storage business, which is still a profitable operation.

This buildup of new ammonia-producing capacity—in these and in other sections of the country—means that in the short-term future the ammonia fertilizer buyer will be in the driver's seat. But if the current rate of fertilizer consumption continues upward, producers look for supply and demand to balance by '65 or '66.

Silver Demand: Industry Tallies Big Gains



Silver Shines in New Roles

Silver, long classed as a precious metal, is undergoing a change of status. Its importance to industry is vaulting. And this poses a threat of shortage by next year — and an almost certain price hike.

The U.S. Treasury has kept the price in check for years by selling off its stockpiled metal. But that supply is running low and silver use is climbing steadily. This was underscored last week in Washington by producers, consumers and commodity exchange experts called together by the Treasury.

The metal's unmatched electrical conductivity, its ability to form salts and other compounds with valuable photosensitive, chemical and bactericidal properties have made it a much-demanded industrial item. Sixty percent of the more than 100 million oz./year of silver now used goes into nonglamorous, industrial jobs, whereas its role in "arts" (jewelry, etc.) is diminishing.

Photochemical Spurt: Largest and most important industrial use of silver is in the manufacture of compounds that go into light-sensitive paper and film for amateur, professional and commercial photography, X-ray and motion picture film. About 28-32 million oz. were consumed last year, accounting for 30% of the total silver marketed.

Film makers say photography has grown at a rate of almost 10%/year since World War II and this growth is expected to continue over the next 5-10 years. But the net increase in the use of silver will probably not parallel this growth because of increasing popularity of color film, which depletes less silver than black-and-white film in processing (about 90% of the silver is recovered in finishing color film, while only 50% is recovered in processing of black-and-white films). There will, however, be some increased use of silver for making sensitized paper for industrial copying machines, probably to 45 million oz. by '65.

The use of electronic tape-recording poses some threat to the role of film in motion picture and television applications, but major film producers believe that this will not become a serious problem for at least another 10 years. Right now amateur photography is the large outlet for film, and use of electronic tape by amateurs seems impractical.

Solders, Brazing Boom: More silver is going into nonferrous bonding and brazing jobs—an estimated 20-24 million oz. in '60.

Silver solders are essentially alloys of silver, copper and zinc; silver content varies from 10-80% (average is about 40%). These solders are used in automobiles, air conditioners, refrigerators and other electrical appliances, and in rockets and jet aircraft. Such specialized high-temperature applications require a bonding material that will produce joints that are resistant to corrosion and that can also withstand severe vibration and shock.

The brazing and solder industry is expected to grow at the rate of 6%/-year but indications are that its use of silver will not expand quite so dramatically—probably to 25 million oz. in five years.

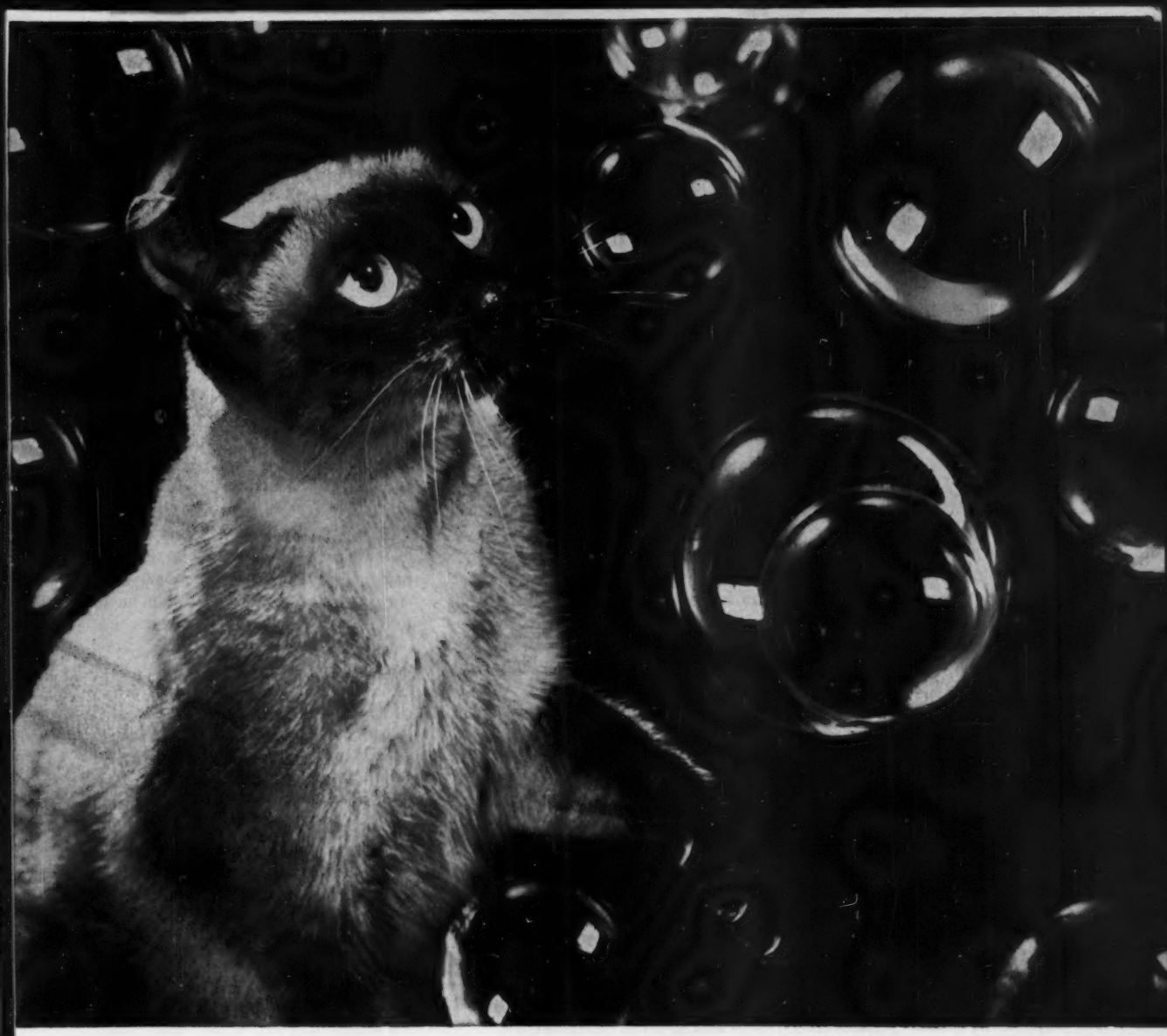
Electrical Outlook: The third most important silver user is the electrical industry. Silver is the chosen material for electrical contacts where low resistance is important. About 19 million oz. went into this use in '60.

Silver's popularity in the electrical industry stems from the metal's high conductivity, coupled with low contact-resistance. For example, the corrosion product forming on silver is silver sulfide, which is conductive, whereas the corrosion product forming on copper is nonconductive copper oxide.

As the U.S. standard of living continues to rise, the appliances market will expand (at an expected 4-5% rate) and will produce a silver market estimated to be 23 million oz. by '65.

Small but Growing: The ceramics industry makes use of silver salts in overglaze colors and as a conductor and electrode material on electronic ceramics. Currently it takes 1-1.3 million oz. and will grow slightly.

Silver also has been used for many



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years as a catalyst in vapor-phase oxidation reactions but in rather insignificant amounts. Growth in this area is expected, but likely won't push this outlet to the 1-million-oz./year mark. Use of silver in silver-zinc and silver-cadmium batteries is expected to gain substantially, as is its role as a bacteriostatic agent (e.g., for water purification). Other applications —e.g., in the production of dental alloys, steel-backed aircraft and diesel-engine bearings and bushings, mirror backing, desalting kits, pharmaceutical solutions and ointments, etc.—will likely not advance markedly.

Coinage: Silver used for coinage purposes accounted for 31% of the total silver consumed in the U.S. in '60—up 13% from '59. This growth is attributed to increased use of vending machines, and demand in this area is expected to rise.

Shortage Ahead? Over-all usage by '65 will probably hit 127 million oz./-year. World silver production, which has been below demand every year since World War II and below industrial consumption in five out of the last six years, cannot, under present circumstances, be pushed to that usage level. And the gap is widening—consumption is increasing at the rate of 5% while production is increasing at half this rate. (One exception: in '60, world silver production rose 6% and matched the 6% demand increase. But this output, 233.4 million oz., was still far below usage, 319.3 million.)

In the U.S., silver production dropped to a 14-year low—30.8 million oz., down 1.3% from '59's 31.2 million. Industrial demand declined only slightly—from 101 million oz. to 100 million in '60. But U.S. consumption, aggregating 146 million oz., was 46% of the total production in non-Communist countries.

The U.S. Treasury holds perhaps the dominant position in the domestic supply-demand picture. The Treasury has a supply of "free" silver — metal that it can draw on for coinage purposes or to sell to industrial users at a fixed price (currently about 91¢/oz.). Sales to industry, however, generally occur only after other sources—from mine production, imports and miscellaneous sources—have been exhausted. And the depletion of "produced" silver occurs earlier each year, with the deficit being made up by drawing on free silver.

During the past three years the supply of Treasury silver has been dwindling. It dropped from 202 million oz. in '58 to 123.5 million in '60. And the decline continues. Treasury silver stocks Oct. 19 were down to 48.4 million oz. At the current rate of depletion the supply would be exhausted by mid-'62. Result: industrial users would have to return to the world market for purchases, and such demand would seem certain to boost the price.

Answer in Sight? The solutions suggested last week at the Treasury officials' meeting with representatives of industry all would eventually mean the same thing—higher-priced silver. The producers told Treasury that it should stop selling silver immediately and let the price of the metal take its natural course. The users said the Treasury should continue selling its supply until the cupboard is bare, then remove the fixed floor price—the 90¢ plus that the Treasury pays for U.S.-mined silver—if it removes the ceiling on producers' price to buyers. The Commodity Exchange wants the Treasury to repeal a '34 provision that places a 50% tax on profits from silver trading. This would encourage speculation and also probably increase the price.

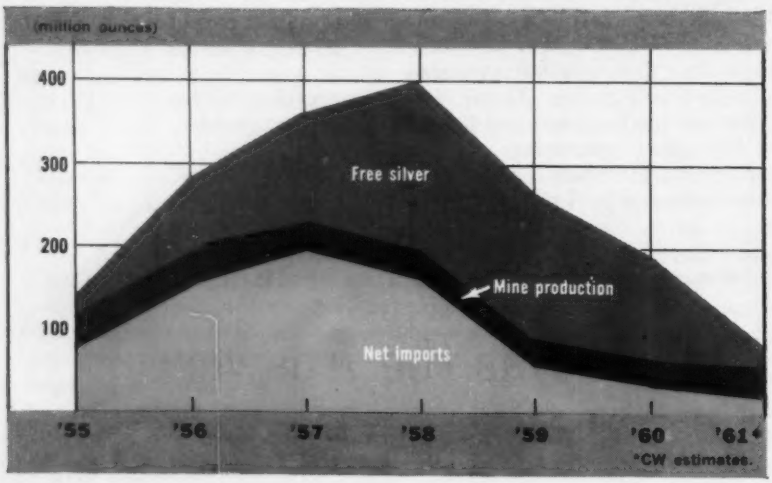
What would this mean to consumers? In the photo field it is estimated that each 10¢ rise in the cost of silver would mean only a ½¢ to 1¢ rise in the price of 100 ft. of film. In the "arts" most of the price of a commodity stems from labor costs—silver accounts for only 20% of the market price of the article. Consequently, a rise in the cost of silver would have little effect on the price of finished equipment, film, jewelry or other commodity.

To the silver producer, however, a rise in the price of the metal would probably mean much more. Most of the present silver mined is by-product metal from lead, zinc and copper mining. Those three metals have been in oversupply, resulting in a cutback in mining and concomitantly the amount of silver by-product. A higher selling price would encourage reopening of silver mines and, of course, boost the income of many of the producers. It might bring new interest in the metal to such companies as major producers American Smelting and Refining Co., Kennecott Copper Corp. and The Anaconda Co. (all of New York).

Foreign markets, where the metal brings a higher price, have been much more attractive to U.S. producers than have domestic markets, and silver has been shipped out of the country in increasing amounts. In fact last year exports were up 190%, totaled 26.6 million oz. This drain on their supply has hurt domestic users.

Outlook: Although consumption has regularly exceeded new production, industry probably won't hit a serious silver shortage. While Treasury sources are drying up, secondary sources will become available — i.e., hoarded silver, demonetized silver, silver from countries such as Red China and Russia—but only at a price. And domestic producers would be tempted, too, by a favorable price—enough so to insure that supply and demand will eventually be balanced.

Silver Available for Industry, 'Arts' and Coinage



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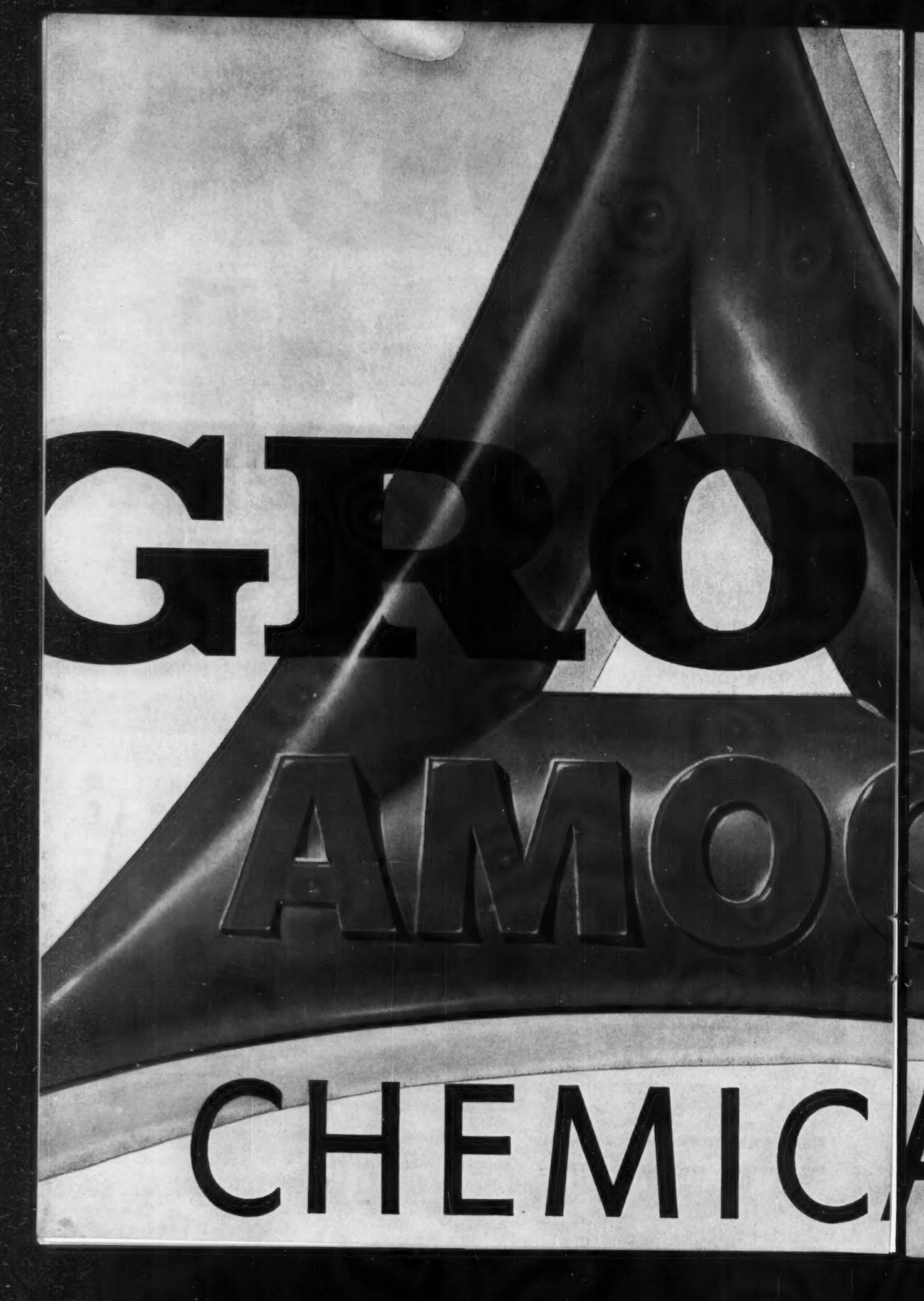
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1. Increased INDOPOL Polybutene capacity 60% by expanding existing manufacturing facilities at Wood River, Illinois.
2. In a joint venture, began construction of a multi-million pound a year Oxo Alcohol plant at Haverhill, Ohio.
3. Nearly completed construction of a Trimellitic Anhydride unit at Joliet, Illinois, which will make this intermediate available in quantity for the first time.
4. Stepped up, by 50%, capacity for the manufacture of Dimethyl Terephthalate at Joliet, Illinois.
5. Began construction of new Hydrocarbon Resin manufacturing facilities at Texas City, Texas, which will double capacity.
6. Through an affiliate, joined Algemene Kunstzijde Unie, N.V. in launching construction of a Dimethyl Terephthalate plant at Delfzijl, The Netherlands.
7. Acquired substantial minority holdings in Furukawa Chemical Industries Company, Ltd., Japan, maker of linear polyethylene.
8. Acquired from our parent company, the chemical research organization of 100 chemists and engineers at Whiting, Indiana, and, in addition, extended customer service laboratory facilities in Chicago.
9. Completed construction and start-up of a petroleum additives plant in Antwerp, Belgium, jointly owned by Amoco Chemicals and Petrofina.

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ETHAN

Monoethanolamine gives woolens a new crease memory

USDA researchers have found that dilute solutions of monoethanolamine will put long-lasting creases in wool. The creases reportedly stay through long exposure to rain and high humidity, and, if the fabric is suitably shrink-proofed, the creases remain after machine washing.

Apparently the monoethanolamine solution affects the molecular structure of the fibers, imparting a "crease memory" to the fabric. Monoethanolamine has the added advantage of being nonvolatile, odorless, safe to handle, and harmless to the fabric. The solution is applied by spraying or dipping with a 0.5 to 2.0 percent solution of monoethanolamine in water, with a small amount of surface-active agent to facilitate wetting. Eventual aim of this process . . . place venerable woolens in the same "wash and wear" class as the youthful synthetics.

Mono-, di-, and triethanolamine are hygroscopic, nonvolatile, mildly alkaline viscous liquids, miscible with water and most alcohols and polyols. Being bifunctional, they can react with acidic materials to form esters or amides or salts, and most of their applications depend upon these versatile features. Some of the diverse applications of these amino alcohols are: gas-scrubbing agents for removal of hydrogen sulfide and carbon dioxide; chemical intermediates in surface-active agents, rubber chemicals, textile specialties, waxes and polishes, herbicides, petroleum demulsifiers, toilet goods, cutting oils, antibiotics and other materials.

Let Jefferson's experienced technical service people help you in any phase of your work with ethanolamines.

OLAMINES

MONO-
DI-
TRI-

MONOETHANOLAMINE

SPECIFICATIONS

Specific gravity, 20/20°C.	1.0170 min.
	1.0190 max.
Boiling range, ASTM, °C.	
IBP:	166 min.
DP:	174 max.
Equivalent weight	61.0 min.
	62.5 max.
Color, Pt-Co scale	15 max.
Odor at room temperature	Mildly ammoniacal

SELECT PROPERTIES

Boiling point, 760 mm.	170.5°C.
Flash point (open cup)	200°F.
Melting point	10.5°C.
Vapor pressure, 20°C	1 mm. Hg.
Weight, 20°C.	8.47 lbs./gal.

DIETHANOLAMINE

Specific gravity, 30/20°C.	1.0900 min.
	1.0950 max.
Equivalent weight	104.0 min.
	106.0 max.
Color, Pt-Co scale	20 max.
Diethanolamine, wt.%	98.0 min.
Monoethanolamine, wt.%	1.0 max.
Triethanolamine, wt.%	1.5 max.
Water, wt.%	0.15 max.

Boiling point, 760 mm.	269°C. (decomposes)
Flash point (open cup)	280°F.
Melting Point	28.0°C.
Vapor pressure, 20°C	<0.01 mm. Hg.
Weight, 30°C.	9.09 lbs./gal.

TRIETHANOLAMINE

	Standard Grade	99% Grade
Specific gravity, 20/20°C.	1.1220 min.	1.1240 min.
	1.1300 max.	1.1270 max.
Equivalent weight	140.0 min.	148 min.
	145.0 max.	150 max.
Color, Pt-Co scale	75 max.	75 max.
Triethanolamine, wt.%	85.0 min.	99.0 min.
Monoethanolamine, wt.%	0.5 max.	—
Diethanolamine, wt.%	15.0 max.	—
Water, wt.%	0.2 max.	0.2 max.
Odor	Not more than slightly ammoniacal	
Iron, ppm.	—	10 max.

Boiling point, 760 mm.	360°C.
Flash point (open cup)	365°F.
Melting point	21.2°C.
Vapor pressure, 20°C.	<0.01 mm. Hg.
Weight, 20°C.	9.37 lbs./gal.

Above products are clear and substantially free of suspended matter.

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Jefferson ethanolamines are available in tank cars, tank wagons in certain areas, and 17E non-returnable steel drums of 470 (mono-), 490 (di-) and 520 (tri-) pounds capacity from the Port Neches plant or terminals throughout the country.

Handling and storage of ethanolamines is a straightforward operation. Storage tanks should be of carbon steel according to approved codes. In general, if low color amine is needed, stainless steel tanks and heating coils are preferable to carbon steel. Storage temperatures in excess of 120°F. should be avoided. Normal precautions to guard against excessive atmospheric moisture should be taken.

TECHNICAL INFORMATION

For detailed data on uses, properties, handling and other aspects of ethanolamines ask for our new ETHANOLAMINES Technical Brochure, or contact our technical service people . . . Jefferson Chemical Company, Inc., 1121 Walker Avenue, P. O. Box 303, Houston 1, Texas.

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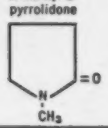
Combining optimum solvency with maximum safety in industrial handling, this stable lactam and this versatile lactone each offer many special features:

- high solvent capacity
- good hydrolytic and thermal stability
- wide organic-solvent and water miscibility
- high boiling and low freezing points
- noncorrosiveness
- ease of recovery
- low vapor hazard

	N-Methyl-2-pyrrolidone	Butyrolactone
Structure		
bp (°C)	202	204
mp (°C)	–24	–44
flash p (°F)	204	209
sp gr 25/4°C	1.03	1.12
viscosity cp at 25°C	1.7	1.7
completely miscible with	water, most organic solvents	water, methanol, acetone, benzene, carbon tetrachloride, ethyl ether, monochlorobenzene (immiscible with aliphatic hydrocarbons)

POLYMERS—Solvents of unusual utility, Methylpyrrolidone and Butyrolactone can be effectively used for a wide range of resins, including PVA, PVC, polystyrene, nylon and aromatic polyamides, polyesters, polyacrylics, cellulose derivatives, and fluorinated hydrocarbons.

In **surface coatings**, these solvents improve the fluxing and fusing of resins into uniform and continuous films by controlling the rheological properties of the formulation, e.g., methylpyrrolidone speeds coating action of many resins in wire insulation enamels. In **purification** of compounds with limited solubility in other organic media, good yields and high purity can be obtained from these solvents, e.g., recrystallization of terephthalic acid from Methylpyrrolidone and purification of polyamides with Methylpyrrolidone or Butyrolactone. In **paint removers**, in the **stripping of plastisols** or other resinous material from valuable substrates, and in the **solvent welding of plastic films**, Methylpyrrolidone and Butyrolactone act as highly effective softening agents. Methylpyrrolidone is also useful as a **spinning solvent** for synthetic fibers.

AGRICULTURAL CHEMICALS—Methylpyrrolidone is an effective and efficient solvent for mercurial seed disinfectants as well as common insecticides, such as chlordane, DDT, lindane, and toxaphene.

PIGMENTS—Methylpyrrolidone, as a dispersing and wetting agent, facilitates incorporation of organic and inorganic pigments into coating systems. Its dispersing action tends to increase tinctorial strength and reduce color drift. Thus, Methylpyrrolidone provides a means of extending expensive pigments and aids in the economical preparation of a universal tint.

DEGREASING—Butyrolactone improves the efficiency of anionic and nonionic surfactant systems in industrial cleaning and degreasing operations.

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SOVFOTO

Premier Khrushchev lays down his 20-year economic and political goals to the Communist party congress.

Setting Steep Chemical Goals

At the Twenty-second Congress of the Soviet Communist Party this month, Premier Nikita Khrushchev laid down his cold-war objectives and the means by which he aims to achieve them. Looming large in his economic offensive are plans to expand Russia's chemical industry.

In outlining the projected status of the Soviet economy during the next 20 years at the Communist party congress, Khrushchev revealed that the Soviets are counting on the chemical industry to show the highest rate of increase of any industrial sector of the economy. His report on Soviet goals for 1980 for the first time included some fairly precise long-range tonnage targets.

Industry Leader: Soviet chemical output is to rise about 17-fold over the next 20 years, with the product range considerably broadened. Polymer chemistry is to "advance substantially," Khrushchev said, with output of synthetic resins and plastics to increase a staggering 60-fold. Synthetic and man-made fiber output (evidently including cellulosics) is counted on for a 15-fold increase, and "mineral fertilizer" output is slated for a 9-10-fold boost (this apparently includes nitrogen fertilizers).

Khrushchev also set a high goal for the gas industry — a 14-15-fold increase—but other industries get off relatively easy. None is targeted for anything higher than roughly a 10-fold increase except electrical power and consumer goods, while many (steel, coal, oil, textiles) are ticketed for a 5-fold increase or less.

Khrushchev gave specific figures for the areas that will get the main push: synthetic plastics and resin output is slated to rise from 332,000 metric tons (731.9 million lbs.) in 1960 to 5.3 million tons (11.7 billion lbs.) in 1970 and 19-21 million tons (41.9-46.3 billion lbs.) in 1980; synthetic fiber output increasing from 211,000 tons (465.2 million lbs.) in 1960 to 1.35 million tons (2.98 billion lbs.) in 1970, and 3.1-3.3 million tons (6.8-7.28 billion lbs.) in 1980; while "mineral fertilizer" production rises from 13.9 million tons in 1960 to 77 million tons in

1970 and 125-135 million tons in 1980.

Production of gas, meanwhile, is supposed to increase from 1,659 billion cu. ft. in 1960 to 10,943-11,472 billion cu. ft. in 1970 and 24,004-25,416 billion cu. ft. by 1980.

Khrushchev also named the locales for these CPI expansions in his marathon speech. "Large centers of the chemical industry [will be put] in regions with abundant resources of cheap natural and petroleum gases . . . primarily in the Urals, Volga area, Ukraine, northern Caucasia, Siberia, and central Asia."

Fertilizer for Food: In his lengthy discourse on Soviet agricultural plans, the Soviet Premier called for a big increase in the cultivation of leguminous crops, which will accumulate vast amounts of nitrogen in the soil. But he quickly warned planning officials not to think this will eliminate the need for more chemical fertilizer plants:

"No, comrades, one of today's most urgent tasks is to develop the chemical industry, raise the output of mineral fertilizers, including nitrogen fertilizers, as well as herbicides and other chemicals to control weeds and pests." It is, he said, "no exaggeration to say that we must put the production of fertilizers on an equal footing with the mechanism of agriculture, for both are decisive factors in promoting a greater output of agricultural produce."

Russia's lag behind the U.S. in farm productivity is pointed up, incidentally, by a new set of figures put out last week by the National Industrial Conference Board. They show that the U.S. outproduces the Soviet Union by an average annual rate of 60% even though we use only 329 million sown acres to Russia's 510 million.

Petrochemicals Growing: Khrushchev also spoke of the growing role of petrochemicals. "The chemical industry is employing natural and petroleum gas as a raw material on an ever-increasing scale," he said. "This has enabled us to considerably reduce production costs and economize on a large quantity of unprocessed foodstuffs. Thanks to the fact that [gas] is used for production of alcohol, this year alone over 2.1 million tons of grain have been conserved. The output of plastics and artificial fibers has been more than doubled in six years."

But Khrushchev made it plain that he thinks far too much gas from oil wells and gas wells is being flared or otherwise wasted.

During the last three years, he said, 1,059 billion cu. ft. of gas have been dissipated or flared in the oil fields. Natural gas so lost would satisfy the needs of big industrial centers like Moscow, Leningrad, Kiev, Minsk, and Magnitogorsk combined, while lost oil well gas would be sufficient to produce about 1 million tons of synthetic rubber, by Soviet calculations.

Goals Not Impossible: By projecting a 17-fold increase in chemical output during the next 20 years, Soviet planners are betting on an average annual increase of about 15%. The U.S. industry averaged only a 7.3%/year increase in the 1950-60 period, and there's no reason to expect a significant increase in this rate —or even as high a rate—in the next 10 or 20 years. But, as has been frequently pointed out, Russia is growing from a smaller base. There's no way to compare accurately the size of each country's total industry, but all indications are that this country's industry is still far larger.

But where Russia intends to place special emphasis, it may surpass U.S. output by 1980. Take plastics. Last year Russia produced only about 731.9 million lbs., compared with U.S. output of some 6 billion lbs. By 1980, Russia expects to produce at least 41.89 billion lbs., while U.S. output may only be something like 30 million lbs., according to current estimates. Long-term predictions are hazardous, of course. A real "take off" of new products could significantly change expectations.

Considering Russia's determination, its raw material resources, and the fact that it is buying large amounts of equipment and know-how from Western Europe, the Soviet Union goals are not unreachable.

But even if Russia does meet its goals in plastics, fibers, and fertilizers, this achievement *per se* doesn't have significance, either for Russia's economy as a whole or for its relationship with the U.S. Their significance could be read only in the context of the Soviet economy as a whole. Increased fertilizer output could be a boon to agriculture, for example, but its potential effect could be to some degree negated by lags in farm equipment production, distribution bottlenecks, floods, droughts, or social problems arising from the organization of Soviet agriculture.

Likewise, the significance of Russia's achieving its plastics goals depends not only on what kinds of plastics are produced (not spelled out) but also on how they are used. They might go into exports, to boost consumer goods, to substitute for other structural materials, etc.

In other words, you have to take into account two critical unknowns in trying to read the significance of Soviet chemical goals: What use does Russia intend to make of the materials it hopes to produce? What uses will the state of the economy actually permit?

Pie in Sky? While experts in Washington grant that Russia's individual industry goals don't look unreasonable, they believe they probably can be attained only at a high cost. It might be done, for example, by retarding growth in other sectors and creating some severe strains and disruptions within the Soviet economy as a whole.

Khrushchev's boast that the Soviet Union will be producing more goods and services than the U.S. by 1980 is considered empty. It's based on an inflated estimate of Soviet growth prospects and on the assumption that U.S. growth will be much slower than U.S. experts think likely. The best guess of most Soviet experts in Washington is that the Soviet Union might pull about even with the U.S. by the end of this century or early in the next. Most observers, however, place little value on such quantitative comparison's in the light of the two countries' radically different economic organizations and social and political goals.

Comparisons aside, the Soviet's goals seem inflated, to judge from past performance. To achieve Khrushchev's goal of a 5-fold increase in over-all output by 1980, Russia's growth from now on would have to average 8.5%/year. It managed a 7% average increase, in the '50's, U.S. experts calculate, but only 6% in recent years. If the recent average were to be maintained, Soviet output would be no more than tripled in the next 20 years.

Strenuous Effort: The only way Khrushchev could reach his over-all target, U.S. officials believe, would be by launching a massive drive to boost

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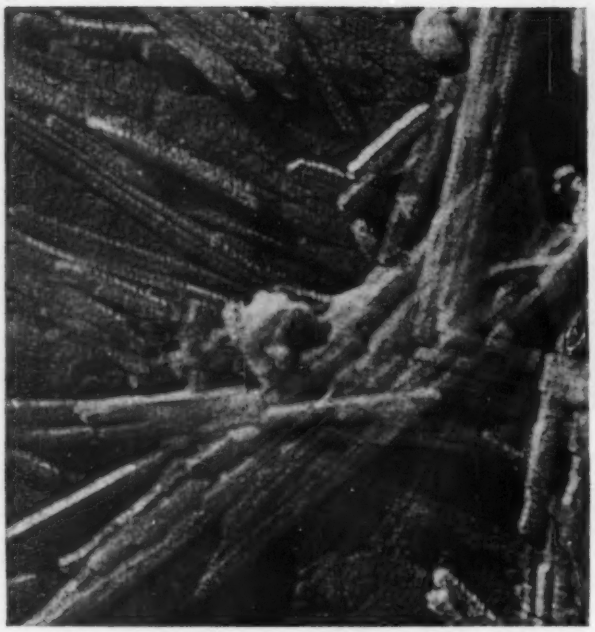

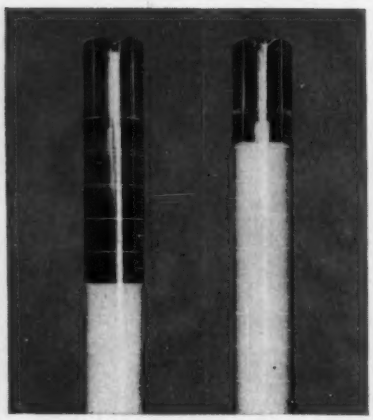

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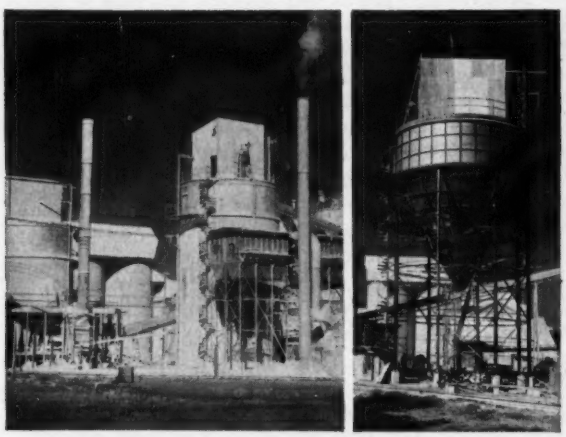

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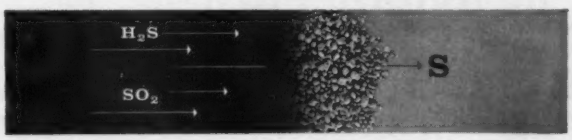

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HERE'S THE NEW IDEA... USE HYDRIDES FOR PORTABLE OR "BUILT IN" SOURCES OF HYDROGEN!

Think for a moment... hydrogen generated from a little pill or small amounts of "powder." How many applications for such unique hydrogen "generators" come to your mind? We'll wager you can quickly think of at least five.

Three hydrides, sodium borohydride, lithium aluminum hydride and calcium hydride can turn these ideas into profitable realities. Just glance at the chart below. See which hydride might fit best. Then, get in touch with MHI Technical Service!

Hydride	H_2 Generated in Liters	Molecular Weight	Theoretical Density
Lithium Aluminum Hydride	2.36 H_2/gm	37.94	.9 gms/cc
Sodium Borohydride	2.37 H_2/gm =	37.86	1.074 gms/cc
Calcium Hydride	1 H_2/gm	42.10	1.8 gms/cc

All three hydrides are safe and simple to use and handle. And they are available either as high purity "powders" or in smooth, convenient size pellets. The cost? The advantages are so over-powering, chances are excellent that the economy factors will be favorable, too! To find out, write or call today!

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consumer goods output. But that would mean pulling large numbers of workers off the farms—hardly likely since low agricultural output is Khrushchev's biggest economic problem and is likely to remain so for a long time to come.

Another factor causing skepticism among U.S. experts: Khrushchev's heavy stress on increasing social services. This will take manpower, and it's not very clear where it is going to come from.

Other aspects of Khrushchev's plans also are puzzling. While the experts believe that Russia could achieve its enormous planned increases in steel, oil, coal, and electrical output, they don't see how these gains will be absorbed by the economy, and put to work. The Russian obsession with steel may lead the Soviets to substitute it for more suitable newer materials. The resultant economic distortions could counter some of the gains.

In any case, the Soviet plans cannot be dismissed lightly; that nation has made good on too many "impossible" projects in the past.

More for Montecatini

Italy's Montecatini continues to increase its foreign interests. Last week several new projects were being negotiated in India and in Japan.

In India, Montecatini has offered technical and financial collaboration in four new plants to be built for polypropylene, industrial and mining explosives, methanol and formaldehyde, and polystyrene resins.

These would not be Montecatini's first Indian ventures. It has already supplied the technology for the government's Sindri and Neiveli nitrogen fertilizer plants, and will be a partner in the projected 10,000 tons/year Madras Aluminum Co. venture.

In Japan last week, Managing Director Piero Giustiniani revealed he had negotiated three more polypropylene licenses—with Mitsubishi Rayon, Toyo Rayon, and Toyo Spinning. They are planning to produce polypropylene fiber. Montecatini had previously licensed three other companies to produce resin primarily for plastics—Mitsubishi Petrochemical, Mitsui Petrochemical and Sumitomo. Each of the latter has slated a 10,000 tons/year plant.

Triple Merger

Within the next few weeks stockholders of Union Chimique Belge (UCB) of Brussels, Union des Fabriques Belges de Textiles Artificiels (FABELTA), also of Brussels, and Societe Industrielle de la Cellulose (SIDAC) of Ghent will vote on their boards' recent agreement to join forces.

UCB is already one of the largest Belgian chemical producers. While it does not publish sales figures, its profits last year were listed as $797,500, not counting directors' share of profits, the dividend tax and a national emergency tax. Altogether, the proposed new entity—to be called the familiar Union Chimique Belge—would have sales estimated at $100 million, $50 million in assets, and would employ about 10,000.

Union Chemique is the biggest of the three. Its broad product line includes coke, ammonia and its by-products, nitric acid, nitrate fertilizers, phosphoric acid and polyphosphates, ethylene by-products, heavy acids, lithopone, hydrogen peroxide, copper salts, casein, gelatin, coal tar and light oil by-products, by-products of naphthalene, benzene, phthalates, maleic anhydride and xanthate; insecticides, fungicides, antifreeze, detergents and pharmaceutical specialties.

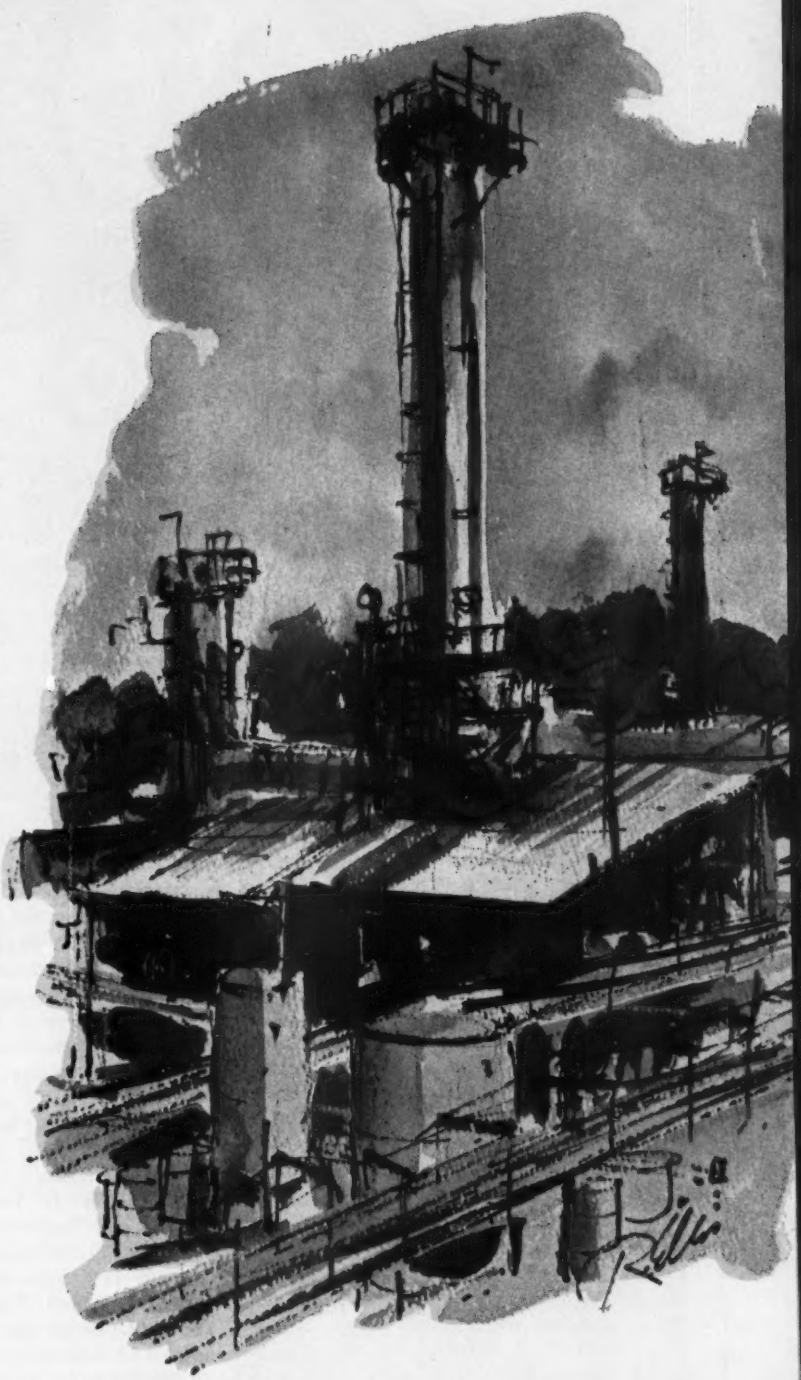
UCB holds interests in a number of Belgian industrial and commercial firms, such as Pharmacie Centrale de Belgique and Soie Artificielle de Tubize, and has several overseas affiliates and licensees. It owns a pharmaceutical affiliate with the U.K.'s Glaxo Laboratories, and also has an engineering arm, Enterprises et Constructions, which plans, equips and builds plants for UCB and other process companies.

FABELTA produces synthetic fibers—acrylic, polynosic, polyamide, cellulosic. It already has links with UCB—through their 50-50% ownership of Inchemtex (New York), their U.S. representative, and through UCB's interest in Soie Artificielle, which holds an important interest in FABELTA.

SIDAC produces a variety of plastic products, including cellophane, polyethylene films.

Like the other two firms, SIDAC is one of the leading companies in its field.

CREATIVITY IN CUSTOM PROCESSING . . .



Truland offers an unusually broad spectrum of services and facilities of special interest to the process industries. These services range from original processing of raw materials for a finished product of strictest specifications to larger scale recovery of a wide variety of wastes, by-products and residues. This suggests a successful solution for you, from problem to product to package, all on a confidential custom basis.

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TRULAND CHEMICAL DIVISION

East Rutherford, New Jersey

Kurt Hansen of West Germany

DRAWING BY RICHARD KLUGA

Bayer's New 'Americanized' Chief

West Germany's largest chemical company has named its "most Americanized" executive to the firm's top job. That's how his close business associates describe Kurt Hansen, 51-year-old chemical engineer who last month succeeded the late Prof. Ulrich Haberland as president of Farbenfabriken Bayer.

Hansen won this label primarily as a result of his U.S. tour in '54 as a top member of the Bayer team that set up Mobay Chemical with Monsanto. He proved an enthusiastic and astute student of U.S. methods.

Hansen's orientation in U.S. business methods and conditions should stand him in good stead. As he suggested in a CHEMICAL WEEK interview recently, the German industry is entering what might be described as its "U.S. period." On the one hand, Hansen sees the fantastic post-World War II boom drawing to an end, expects European industry to slip into the U.S. pattern of cyclical ups and downs and a 6-7%/year growth rate. On the other hand, the formation of the Common Market is creating a U.S.-scale market. This, and the increasing demand for more-sophisticated products, will affect marketing, business techniques and technology. Moreover, the very presence of U.S. companies is revolutionizing the European chemical industry.

Aimed at the Top: In this setting, Hansen's U.S. experience and outlook are prized assets. But the young executive—by German management standards 51 is very young—brings a great deal more to his new job. His formal education—a doctorate in engineering (organic chemistry major) from Munich's Technical College and a degree in business administration—was perfectly tailored to his future rise.

In his 25 years with Bayer, Hansen has acquired a comprehensive background in virtually every aspect of the company's operations.

Hansen's first assignment with Bayer (in '36) was in the Wolfen photochemicals plant of the company's Agfa subsidiary. He was soon transferred to Leverkusen to work on photographic paper, rounding out his background in one of Bayer's major product lines. From the photo line he moved to dyestuffs and later general organic intermediates at Leverkusen, where he had become plant superintendent by the war's end.

His first major step into management ranks came shortly after his Mobay assignment in '55, when he was made prokuristen (roughly the equivalent of works manager).

Soon afterward Hansen went to India as part of a German technical team to help India lay the foundations of a chemical industry. The trip also gave him the chance to pave the way for Bayer's Indian subsidiary, Colour Chem Ltd., held jointly with Hoechst and the Indian government.

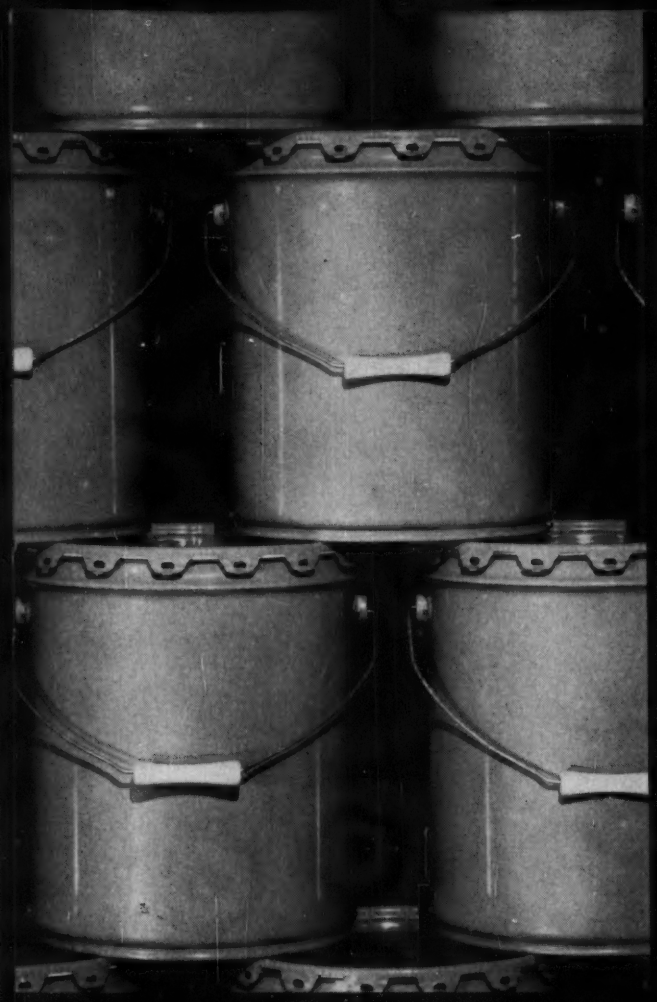
Hansen returned to take over Bayer's big Uerdingen works, and in '56 became works manager of the giant Wuppertal-Elberfeld complex, where Bayer turns out a large part of its pharmaceuticals and insecticides.

In rapid order Bayer put him in charge of all its pharmaceutical and agricultural chemical operations, and (in '57) named him to the management board as a vice-president.

When Haberland died Sept. 10, Hansen stepped into the presidency, becoming the first "second generation" chief of any of the Farben splinters.

Digging In: For the moment, Hansen isn't planning anything new for Bayer. "We are already a beast with a thousand legs," he says. "Of course we will continue to improve and modernize our product lines and expand production to meet demand. But don't look for us to get into something totally new, as we did with titanium dioxide or the isocyanates."

He feels that Bayer's major job now is to consolidate its gains, get ready for the fierce international competition that lies ahead.



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Rheem Centrifugal Lining process makes pail linings completely uniform...completely dependable

No pinholes, no blisters, no skips, globs nor thin spots occur in lining applied by this patented method. Thickness is controlled to 1/10 mil tolerance over every inch of pail interior.

The Rheem Centrifugal Pail Lining process was developed especially for coating the interiors of cylinders. By using the highly efficient principle of centrifugal force instead of conventional spray gun techniques, it assures a new excellence in protection for products packed in pails.

Every pail lining variable is controlled: amount of lining applied, application angle, application speed. All are invariably uniform ... and so are the finished linings. The automatic Rheem process eliminates air turbulence, human error and reduces solvent content, too.

It's a process that assures the same product purity on delivery as at filling.

If you are now using pails lined by another process, or using packages of other basic materials, write for samples, information on linings or a testing program to 1701 West Edgar Road, Linden, N. J. Plants across the country.

WORLD'S LARGEST MANUFACTURER OF STEEL SHIPPING CONTAINERS

Rheem

How it works: Pail shells move up to automatic Centrifugal Lining equipment (left). Positioning arms clamp pail and (right) raise it past spinning centrifugal applicator head. Angle, distance and speed never vary. Result: completely uniform linings – completely dependable protection for your product.

Don't get boxed in by oxygen supply problems...

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CHEMICAL ENGINEERING SALES FILE
Re: Keeping Ahead of Markets / 9

"No rest, even on the road. So much detail to devour, so little time to catch up on market trends and new sales opportunities." TO THE RESCUE: Now ready, for you, a timely CE Special Editorial Report, *Petrochemicals: What's Ahead?* Here is a compact, complete wrap-up of one of the busiest of the busy Chemical Process Industries . . . profits, problems, marketing, raw materials, costs, plant growth, regional activity, etc. Free and available only from . . .

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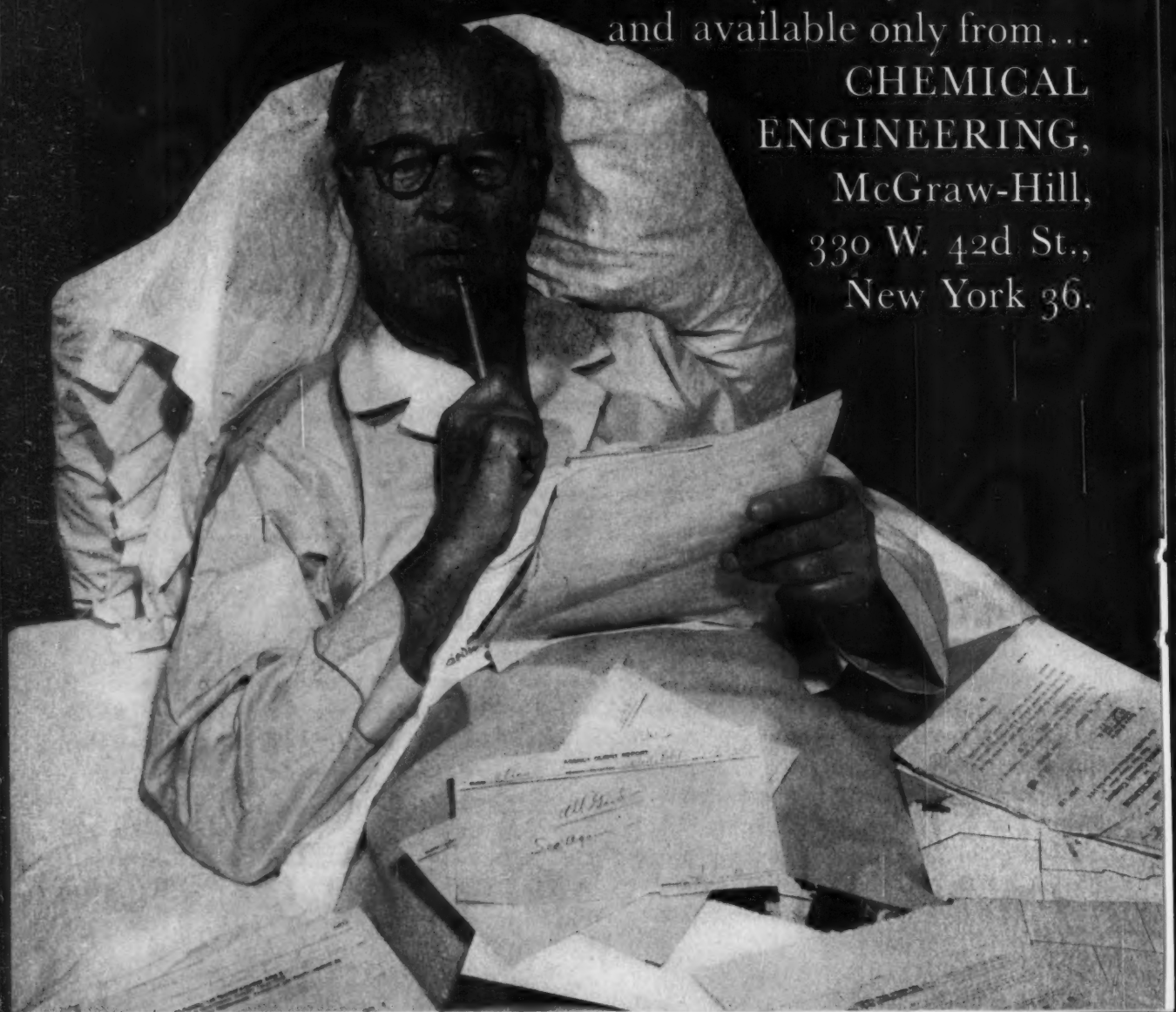


Twin Twist Cuts Time in the Mix

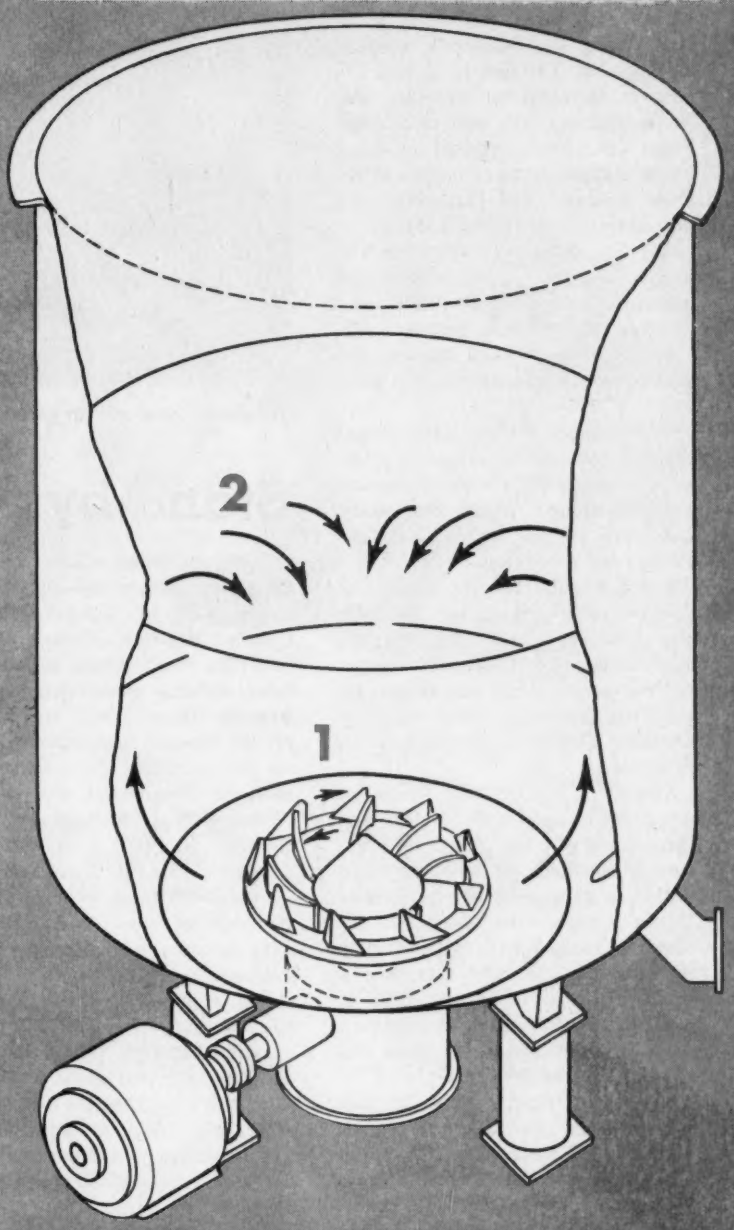
Pulp and Paper Research Centre, Inc. (Lawrence, Mass.), developed the high-efficiency mixer (Dualator), shown at right, to improve the defibering of difficult-to-repulp paper stock. But the unit has done the repulping job so well—cutting processing time and power consumption in half—that the firm is now looking for other chemical process industries work in which the Dualator may solve tough mixing problems.

The key to improved mixing effectiveness is two rotors—one set within the other—operating in opposite directions in the bottom of the tank or tub in which the material is being mixed or defibered. The vertical edge of each vane on the rotors subjects the material to high-velocity impact. And, because the rotors spin in opposite directions, the direction of movement of material is reversed at a speed of 6,000 ft./minute, producing hydraulic shear forces that tear the material to shreds.

The outer rotor acts as a brake as well, slows the flow as it leaves the defibering zone so that circulation throughout the rest of the mixing tub is not turbulent. Most of the energy input to the Dualator is used in the defibering zone rather than in unnecessary, rapid circulation.

More Power, Less Tub: The slow circulation pattern also prevents spinning of the mix and formation of a vortex. This permits the mixing tub to be filled to capacity and increases the utilization of power for mixing. For example, while one Dualator model uses a 300-hp. motor with a 2,000-lbs.-capacity tub, an ordinary pulp mixer might be able to use only a 200-250-hp. motor for the same

New Dualator Improves Defibering Two Ways



1. Defibering and mixing time is reduced 50% in high-efficiency defibering zone between edges of vanes on two rotors moving at high speeds in opposite directions inside the equipment.

2. Energy consumption is reduced 50% by slow circulation of material outside defibering zone. Material moves radially away from rotor, up sidewalls of tub and down into rotor again.

size of tub because faster spinning would splash stock out over the rim.

Pulp and Paper Research Centre has confirmed power and mixing-time requirements in pilot-plant tests on a wide variety of papermaking materials during the Dualator's two-year development. The first plant unit has been in operation for almost a year at the Gilman, Vt., mill of Gilman Paper Co., and a number of other paper companies have expressed interest in units. (The Dualator is being marketed by Emerson Manufacturing Co., division of John W. Bolton & Sons, Inc., maker of pulp and paper mill equipment. P&PRC is also affiliated with Bolton-Emerson, divides its research work between the firm's research and independent projects.)

Wet-Strength Boost: Gilman Paper is using the Dualator because it wanted a repulping unit for hard-sized and wet-strength papers that would cut down the use of chemicals and heat in the processing.

Since the unit reduces the cost of waste recovery, it should boost the use of higher-wet-strength papers in manufacture of nonwoven fabrics, cable-wrap insulation and twisted-paper yarn for woven items, etc., says Donald Danforth, P&PRC vice-president.

Usually 1-2% by fiber weight of wet-strength agents are added, and there is talk of going as high as 3-5%, says Danforth. These additions make defibering difficult in the repulping of "broke"—waste from breaks and off-standard product from papermaking, trimming and finishing operations—which may run as high as 15% of mill product. Repulping practice varies widely, but usually hot water and alum or caustic are used.

Even when treating very dry pulp shipped from pulp to finishing mills, defibering of stock may take up to one-half hour. The Dualator, says Danforth, performs the same operation in 8-10 minutes and will merely pull the fibers apart, not cut them and thereby reduce their strength.

Capacity range of the units now available is 100 to 4,000 lbs.—large sizes for many chemical plant operations (e.g., the 100-lbs.-capacity tub would hold 350 gal. of water). Prices have not been set on units smaller than 1,000-lbs capacity ($19,500 in carbon steel).

CW PHOTO—JOAN SYDLOW

Thiokol's new steam generator emits dense steam cloud during test.

Stand-by Steam in a Hurry

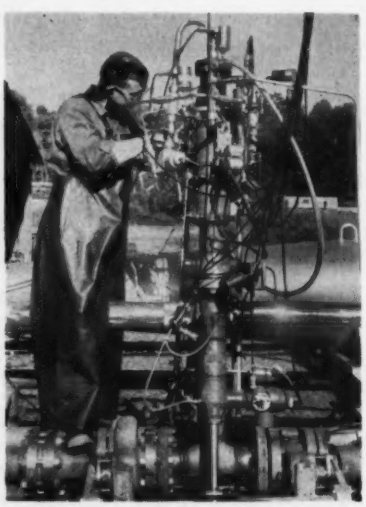
Steam billowing (above) from the jet ejectors used in high-altitude simulation tests at Thiokol Chemical Corp.'s Reaction Motors Division (Denville, N.J.) seems far removed from chemical plant operations. But Reaction Motors is now ready to supply the low-cost, high-capacity generator for producing steam to plants in need of intermittent and stand-by service (CW Technology Newsletter, Oct. 21).

A compact (4-ft. high, 3-ft. diameter) unit will produce up to 150,000 lbs./hour of steam instantaneously, using a mixture of hydrogen peroxide, hydrogen and water. It will be displayed at the Chemshow (Nov. 27-Dec. 1 in New York's Coliseum by Croll-Reynolds (Westfield, N.J.), which supplies the steam jet ejectors as part of a package for high-vacuum generation. A complete generating system can be set up and put into operation within three months at a cost of $100,000.

According to Reaction Motors, its Hyprox Combustor generator can produce steam quantities up to 1 million lbs./hour — multiple units supply up to 4 million lbs./hour. Individual units can be adjusted to meet service conditions. For example, the unit (*picture right*) produces up to 25 lbs./second of 200-psi. dry-superheated steam.

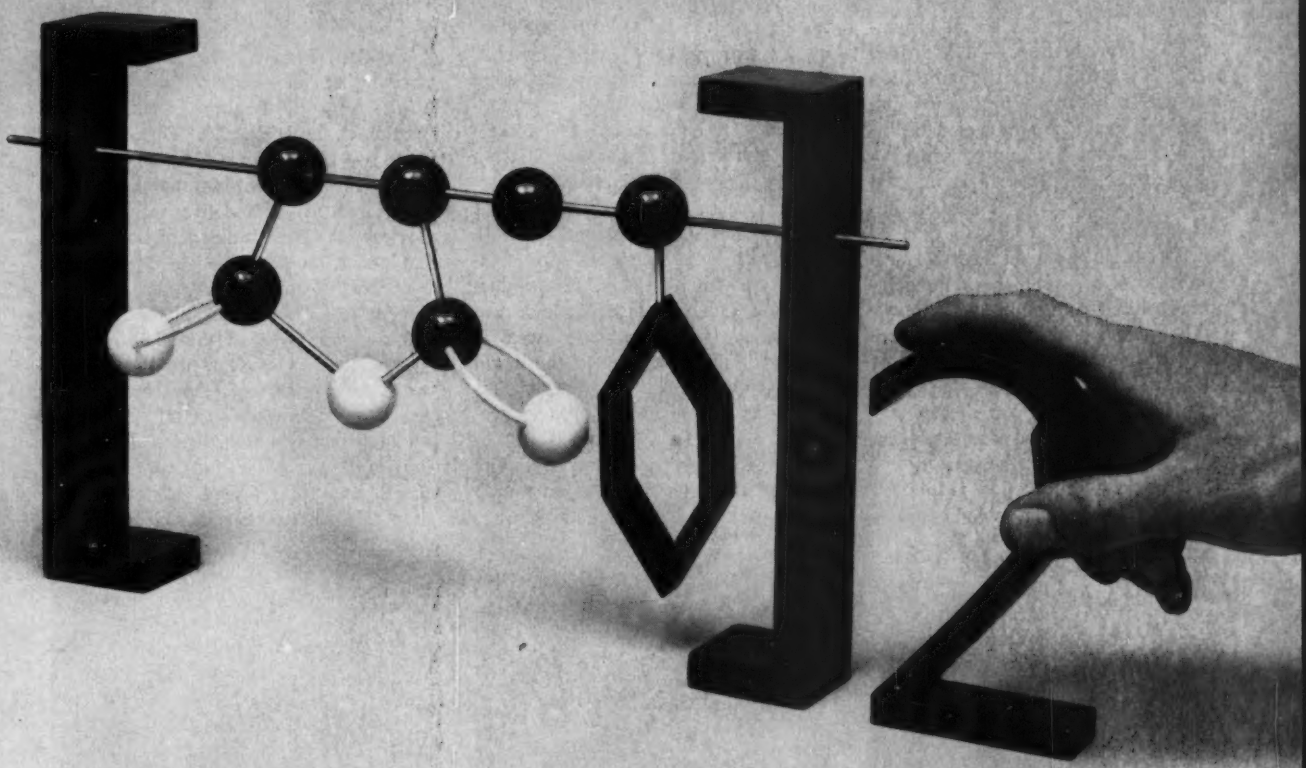
Installed cost is probably less than one-tenth the cost of a conventional steam generating plant of comparable size, claims Ted Sjoberg, supervisor of test-equipment facilities at Reaction Motors. One reason for low cost: the unit can be mounted on any flat concrete surface, doesn't require precise leveling or installation adjustments.

Unit cost of the steam produced is approximately equal to that from a conventional plant, based on periodic operation. However, the cost of hydrogen peroxide would make continuous operation of the Hyprox Combustor



Technician completes prefire check of 25-lbs./second steam-producing unit.

THE SMA 4000A RESIN MOLECULE HAS AN AVERAGE OF ONLY 2 STYRENE-MALEIC ANHYDRIDE GROUPS.



ANNOUNCING: A DIANHYDRIDE FORM OF

NEW SMA™ RESINS

SMA 4000A, most recent addition to TB&C's styrene-maleic anhydride resin family, is extremely low in molecular weight and contains only two anhydride groups per molecule. SMA 4000A undergoes all the usual anhydride reactions such as those with ammonia, amines, alcohols, and glycols. Its dianhydride functionality makes it ideally suited as a chemical intermediate for use in epoxy resin curing, for new polyesters containing functional groups, as well as alkyds and plasticizers. The base resin, SMA 4000A, and certain ester derivatives, are available now in developmental quantities. Samples and complete data on letterhead request.

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Polychemicals Department, 529 Fifth Avenue, New York 17, New York.
TB&C also produces: Butadiene, Butene-1, Butene-2, Mixed Butylenes, Propylene, Alkylate, Avgas.

uneconomical—cost: about 15¢/lb. of steam.

How It Works: The steam generator has four sections — a hydrogen peroxide injection and decomposition chamber, a hydrogen preheating and injection system, a combustion chamber and a water-injection section.

The hydrogen peroxide is injected into the decomposition chamber uniformly, using a showerhead type of injector. A silver screen assembly acts as a catalyst bed for peroxide decomposition into steam and oxygen.

The decomposition products are used to preheat a small quantity of hydrogen (bypassed from the main hydrogen stream). The preheated hydrogen is then injected into the steam and oxygen, acting as the ignitor.

The main hydrogen flow is injected directly into the water-cooled combustion chamber and contacts the ignitor flame. Burning is smooth and superheated steam is formed. In the downstream end of the chamber, water is injected. The combustion products are cooled and the water is vaporized. Operation can be adjusted to produce dry, saturated or superheated steam leaving the combustion chamber.

The steam generator, in use for high-altitude simulation and for subcooling of liquid hydrogen, is connected to a steam jet ejector for production of a vacuum. (In liquid hydrogen subcooling, a low-pressure area is created over the surface of the liquid hydrogen.) An exhaust burner, attached to the steam jet ejector, prevents release of any potentially explosive hydrogen to the atmosphere. The system has a low-flow nitrogen source for valve control and purge systems.

New 'Thriller' Disaster Training

Houston Ship Channel industries, long noted for realistic fire and disaster drills to test their mutual aid program, produced another "thriller" recently at the Rohm & Haas plant.

Pit fires were used to simulate large storage tank fires, and aluminized asbestos proximity suits and blankets (*above*) aided in rescue operation as firemen went into action.

Sixteen industries in the area were called for assistance. Six ambulances, three doctors, four nurses and four first-aid teams augmented the Rohm & Haas doctor, nurse and first-aid men. As in the case of Union Carbide Chemicals' drill in '57, simulated casualties were actually treated for "injuries," although not with the same realism (*CW, July 27, '57, p. 26*). Large quantities of light-ends fuels were used to make roaring fires.

Rohm & Haas' safety director, W. T. Crouse, directed all operations—following the principle that a plant should always control its own emergency situation to avoid confusion when problems arise. "Chemical and petroleum fires are best fought by people who know the properties of the products," says Harold Cunningham, chairman of the mutual aid group.

Maintenance Aids

More than 1,000 engineers jammed Galveston, Tex., for the 16th annual meeting of the South Texas Section of the American Institute of Chemical Engineers on Oct. 20. Highlighted were two maintenance aids: (1) use of epoxy resins in cutting maintenance costs and (2) radioactive measuring devices for quick location of line and equipment blocks.

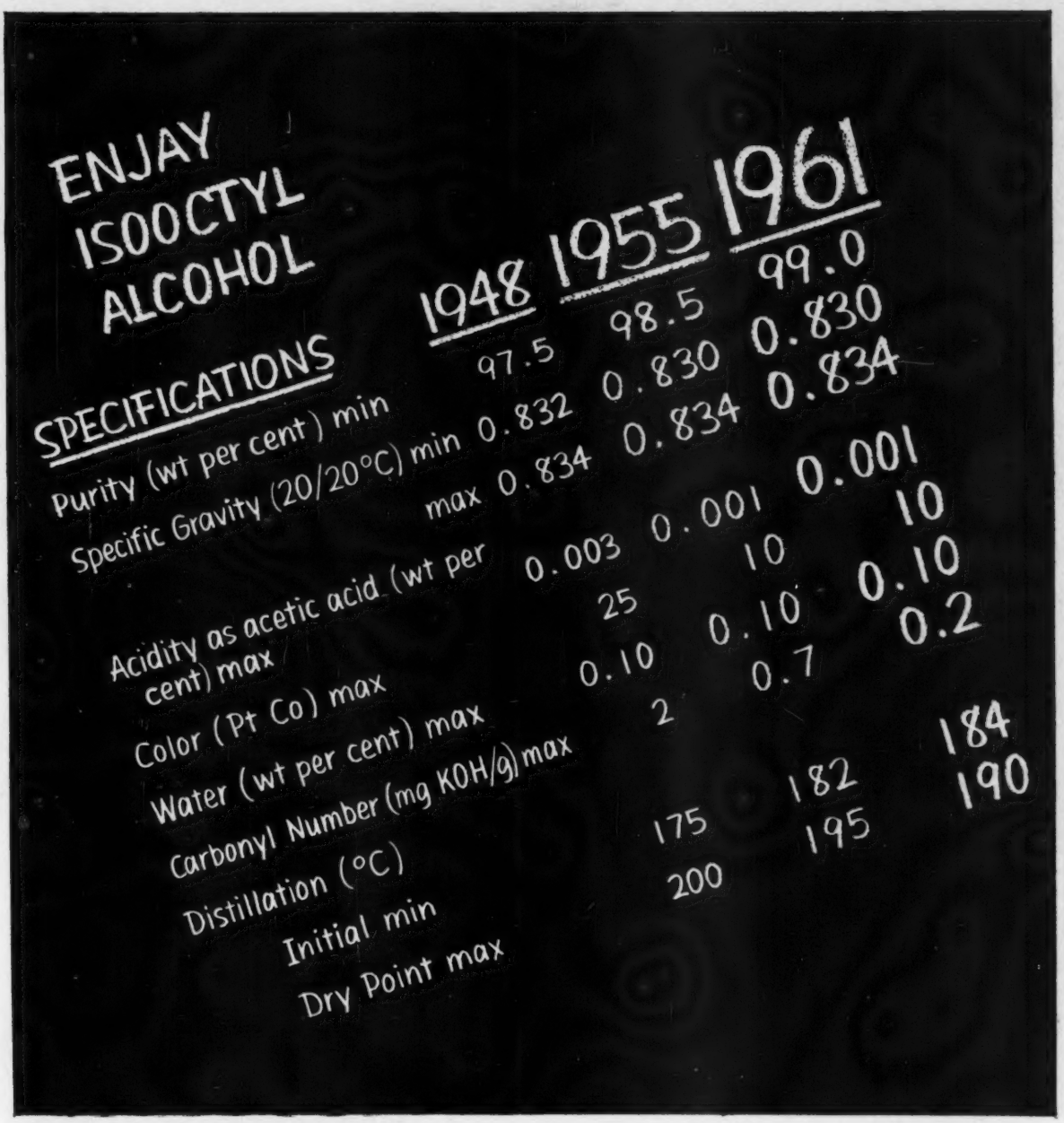
Robert Bacon of Dow Chemical's Freeport, Tex., plant estimated maintenance savings of $1,500-2,000 per pump in using epoxy resins to repair worn pump impellers. Dow, blending its own compounds (and adding molybdenum disulfide to improve the lubricating properties for bearing surfaces), actually reformed the impellers in molds with the epoxies. The surfaces were then lapped smooth.

Dow has also extended the life of lined steel vessels in highly corrosive service by an estimated 250% using epoxy-glass laminates. For example, a steel evaporator operating at 200 F and at a pH of 2 is still in service after two years. And structural pillars, attacked by chlorine fumes, now last twice as long with epoxy coatings.

Radioactive Sleuthing: Royal Benson of Monsanto Chemical's Texas City plant urged greater consideration of radioactive measuring devices, citing examples of Monsanto's use of the instruments to find plugs in distillation columns and pipelines.

In locating a plugged column tray, Monsanto used a portable radioactive source and a geiger counter. As the source is moved up the outside of the column, the geiger counter moves up the wall 180 degrees around the column, picks up the source signal. While little radiation is absorbed as it passes across the vapor space in the column, as soon as a plugged tray is reached, there is a sharp drop in reading on the counter. In locating a plug or misplaced conduit in a pipeline, a radioactive pig is sent through the pipe while a technician traces its path on the counter to the blockage.

Benson feels that the radioactive devices haven't been exploited fully so far because of fear and lack of knowledge on the part of plant personnel. But, in the hands of trained operators, the devices often offer more economical and accurate solutions of maintenance problems.


ENJAY
ISOOCTYL
ALCOHOL
SPECIFICATIONS
1948 1955 1961
Purity (wt per cent) min 97.5 98.5 99.0
Specific Gravity (20/20°C) min 0.832 0.830 0.830
max 0.834 0.834 0.834
Acidity as acetic acid (wt per cent) max 0.003 0.001 0.001
Color (Pt Co) max 25 10 10
Water (wt per cent) max 0.10 0.10 0.10
Carbonyl Number (mg KOH/g) max 2 0.7 0.2
Distillation (°C)
Initial min 175 182 184
Dry Point max 200 195 190

Product improvement never stops at Enjay

Enjay first introduced isooctyl alcohol in 1948 with the specifications shown above. Since that time this higher oxo alcohol has been constantly improved. A comparison of the 1948, 1955, and the 1961 specifications will provide a clear indication of this continuing improvement.

Whatever your needs, you'll find Enjay a dependable source of supply of quality chemicals delivered promptly from convenient supply points. For specifications and typical properties of any Enjay product, write to us at 15 West 51st Street, New York 19, New York.

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ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

ENJAY

Du Pont THF needs no distillation before use

. . . it's 99.6% (min.) pure!

Du Pont THF (Tetrahydrofuran) as a reaction solvent is so pure that costly, time-consuming distillation before use is unnecessary. It can be used directly in reactions which are sensitive to moisture and impurities, such as Grignards. In other reactions, the purity of THF can increase product quality.

QUALITY	SPECIFICATION	TYPICAL ANALYSIS
THF	99.6% min.	99.8%
Boiling range @ 760 mm pressure	65.5-66.7°C.	66.0-66.2°C.
Specific gravity @ 20°/4°C.	0.886-0.889	0.889
Color	Not darker than APHA 20	APHA 5
H_2O by wt.	0.03% max.	0.01-0.02%
Carbonyl by wt.	0.1% max.	<0.05%
Hydroxyl by wt.	0.25% max.	<0.2%
Peroxide by wt.	0.015% max.	none detected

Uses of THF:

THF can be used economically as a solvent for a wide range of chemical reactions. Its unique properties prove useful in Grignard and lithium aluminum hydride reactions:

1. It promotes preparation of aryl and vinyl chloro Grignards*, not obtainable with diethyl ether.
2. Its convenient boiling point—30° higher than diethyl ether—raises reaction rates without resorting to special refrigeration methods—thus improving yields and minimizing solvent losses.
3. It has high solvent power for a wide variety of organic materials.

If you have a potential application for THF as a reaction solvent, a Du Pont technical representative will be glad to consult with you. Write today to: Du Pont, Electrochemicals Department, Chlorine Products Division, Wilmington 98, Delaware.

*U. S. Patents 2959596 and 2959597 assigned to Metal & Thermit Corp., 100 Park Ave., New York 17, N. Y.

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BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

EQUIPMENT

Instrument Pen: The Esterbrook Pen Co.'s Technical Products and Instruments Division (200 Cooper St., Camden 1, N.J.) is out with a new marking system said to provide uninterrupted writing for months under extreme environmental conditions. The system includes a pen, replaceable-cartridge ink supply and sealed capillary system for recording without blotting, smearing or running. The unit, called the Mark-Trol, is offered as a conversion kit that can replace 90% of the marking systems now in use in circular chart recorders.

•

Nonrotary Mixer: The Vibro-Mixer, is a new Swiss unit offered by the Hudson Industries Corp. (2805 Paterson Plank Rd., North Bergen, N. J.) for mixing without stratification or the formation of a vortex. The mixer has a vibrating shaft and a disc, perforated by cone-shaped holes, that moves up and down in short (1.5 mm.) strokes. The unit is hermetically sealed, operates on 220 and 380 volts ac. The unit has no bearings and stuffing boxes, requires no lubrication.

•

Colored Work Clothes: Travis Fabrics, Inc.'s Industrial Division (1071 Avenue of the Americas, New York) has added colored fabrics to its line of Dynel work clothes. Bright red, spruce green and royal blue are now offered in addition to charcoal, navy and natural.

•

Pipe Joining: Victaulic Co. of America (Elizabeth, N. J.) has developed a new low-cost system for connecting plain-end pipe and fittings with its Plainlock Couplings. A Hycar rubber gasket molded by General Rubber Corp. is centered over the pipe ends and covered by iron coupling halves fitted with stainless steel grips. When the couplings are bolted together, the grips engage the pipe ends and lock them together more securely than ordinary sleeve-type couplings, according to VCA. The method can be used for pipes from 1 to 6 in. in size.

•

Metal Buildings: Parkersburg Building Division of the Parkersburg-Aetna Corp. (Parkersburg, W. Va.) is offering a new line of pre-engineered small metal buildings for housing

U. S. BORAX RESEARCH CORPORATION ANNOUNCES **Tetra(dimethylamino)diboron**

A First Step *toward developing a whole new field of chemistry involving compounds with covalent* BORON-to-BORON BONDS

Your Invitation to Research... Tetra(dimethylamino)diboron

TYPICAL REACTIONS

HYDROLYSIS

$B_2[N(CH_3)_2]_4 + 4\,H_2O + 4HCl \longrightarrow B_2(OH)_4 + 4\,(CH_3)_2NH{\cdot}HCl$

Tetra(dimethylamino)diboron — Tetrahydroxydiboron

ALCOHOLYSIS

$B_2[N(CH_3)_2]_4 + 4\,CH_3OH + 4HCl \longrightarrow B_2(OCH_3)_4 + 4\,(CH_3)_2NH{\cdot}HCl$

Tetramethoxydiboron

TRANSAMINATION with an Aliphatic Secondary Amine

$B_2[N(CH_3)_2]_4 + 4\,(n\text{-}C_4H_9)_2NH \longrightarrow B_2[N(n\text{-}C_4H_9)_2]_4 + 4\,(CH_3)_2NH$

Tetra(di-n-butylamino)diboron

TRANSAMINATION with an Aromatic Primary Amine

$B_2[N(CH_3)_2]_4 + 4\,C_6H_5NH_2 \longrightarrow B_2(NHC_6H_5)_4 + 4\,(CH_3)_2NH$

Tetra(anilino)diboron

REDUCTION

$B_2[N(CH_3)_2]_4 + 2\,Ag^+ + 6\,H_2O \longrightarrow 2\,H_3BO_3 + 2\,Ag^\circ + 4\,(CH_3)_2NH + 2\,H^+$

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Consider the column at the left. The reactions listed are but a few of the many types which are possible with this new boron-boron compound.

Don't delay! Write for TECHNICAL BULLETIN 3A/O and your sample of this interesting new diboron compound now.

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Chemical Week
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255 California St., DOuglas 2-4600

equipment, offices and warehouses. The buildings, offered in colors, have clear-span widths of 4-32 ft. and heights of 7-14 ft. They can be constructed in any length using 16-in.-wide wall panels of interlocking type. The panels come in 18-, 20- and 22-gauge galvanized steel, finished in color with thermosetting acrylic resin.

•

Turboshaft Engine: General Electric's (Schenectady 5, N. Y.) new LM50 is a 500-hp. gas turbine for industrial use that will be priced competitively with comparable piston engines. The first unit, coupled to the company's GE-752 direct-current generator on a portable skid, will supply electric power for drilling rig components at Helmerich & Payne, Inc. (Tulsa). The unit weighs 1,000 lbs.—about one-tenth that of piston engines of comparable rating. Additional uses planned: continuous ac. power generation, fire and oil pump drives, gas line compressor drives.

•

Check Valve: A new excess-flow check valve is being offered by the Chemiquip Co. (36 East 10th St., New York 3). The valve has only two moving parts, can be supplied for complete closure or for a slow, calibrated leak. When the flow exceeds a predetermined rate, the spring-loaded poppet valve shuts. After the system has been recharged to normal pressure, the valve automatically resets and normal flow is restored.

•

Nitrogen Level Control: A system for controlling the level of liquid nitrogen in cold traps and other low-temperature vessels is a new offering of Cryogenics, Inc. (Stafford, Va.). The system has an upper-lower limit sensor mounted in a probe which can be attached to process equipment. When the level of liquid nitrogen drops below a predetermined limit, the controller actuates a solenoid valve which transfers liquid into the cold trap until a predetermined upper limit is reached.

•

Fluid Sampling: Wyle Laboratories (El Segundo, Calif.) is out with a new highly accurate dynamic fluid sampling device that provides accuracy within 2.5% of mainstream having extreme density gradients. The sampler can be used for liquids, gases or combinations of the two.

Tracers

TO THE CHEMICAL PROCESS INDUSTRIES

Published: each Saturday— closes 11 days in advance.

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Chemists-Group Leader-Development. ***Require*** Ph.D. and/or equivalent with at least five years related experience or the equivalent for planning, establishing, and supervising development program in aerosols, shampoos, detergents or other hair preparations. Responsible also for selecting equipment, conducting independent literature research, and overseeing work of chemists and technicians. Project Leader-Technical Service to Manufacturing and Production. Require BS Chemical Engineering, two years experience required. Liaison between Research and Development Laboratory and Manufacturing carrying out engineering and plant scale up for new products. Must develop or improve manufacturing procedures and facilities, conduct tests, run trials and assist in evaluation, interpretation, and reporting of results. Most satisfactory work conditions including liberal employee benefits. Kindly apply or send complete resume to: Employee Relations Department, John H. Breck, Inc. 115 Dwight Street, Springfield, Massachusetts.

Plant Manager-Assistant PVC experience required. Opportunity with well established multi-plant corporation. East Coast location. Send full resume in confidence to P-7713, Chemical Week.

Technical Salesman Solvents:—Opportunity to create new department. Michigan and Great Lakes area. A degree in chemistry or chemical engineering, plus selling experience in the petroleum solvent field essential. Send complete resume to I.L. Goldman, V.P., Aurora Gasoline Company, 15911 Wyoming Avenue, Detroit 38, Michigan.

SELLING OPPORTUNITY AVAILABLE

Sales Representatives wanted for the following territories: Wisconsin, Minnesota, Missouri, Kentucky, Michigan, Kansas and Indiana and surrounding area to sell complete line of resins to the paint industry and/or a complete line of polyester resins for reinforced plastics. American Alkyd Industries of Illinois, with the newest and largest Synthetic Resin Plant located at Carpentersville, Illinois, is interested in Representatives and Salesmen with definite large volume accounts available. Write full details to: C. J. Hauck, President, American Alkyd Industries, Carlstadt, New Jersey.

POSITIONS WANTED

Chemist BS-age 30-experienced in R&D, quality control, engineering & management phases in cosmetic, chem specialties & aerosol fields. Outstanding record. Desire growth opportunity-West Coast. PW-7747, Chemical Week.

Sales Executive with strong background in managing overseas operations for American manufacturer of heavy equipment for the plastics, synthetic rubber and petrochemical industries. One year in Japan. Familiar with important licensing and custom proceedings. Seeks position with reputable American company as representative in Japan and the Far East. Daniel Heist, Walton Road, Blue Bell, Pa.

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Sales Engineering Organization Specializing in the sale of mechanical equipment to the Petrochemical industries along the Texas and Louisiana Gulf Coast, desires one or two additional accounts. Reply to RA-7569, Chemical Week.

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For Sale or Lease in Downtown Los Angeles— Close to all freeways. Six-story modern concrete and brick building. Contains three elevators. Presently used as pharmaceutical supply house by one of the nation's largest suppliers. For full particulars write FS-7721, Chemical Week.

For Rent: Paterson, N.J. 1st brk, 26,000 ft, 11,500' bsmt, spkld hi pressure stm, RR siding, fenced yd, unrstd. FR-7742, Chemical Week.

EQUIPMENT FOR SALE

Pfaudler 1250 gal. blue-glass lined jacketed reactor, 72" x 72", Agit. Perry, 1415 N. 6th St., Phila. 22, Pa.

10,000 gal. T316 Stainless vert. tank, 12'x12', 3/16", flat bottom, Nettco #WT-37 drive & turbine agit. Perry, 1415 N. 6th St., Phila 22, Pa.

165 gal. Titanium experimental autoclave, 1000 psi WP, horiz., (3) vert. Agit. Perry, 1415 N. 6th St., Phila. 22, Pa.

Liquidation-Multi-million dollar chemical plant at North Little Rock, Ark. Stainless Steel & Glass-Lined equip. Send for detailed circular. Perry, 1415 N. 6th St., Phila. 22, Pa.

MISCELLANEOUS

To Employers Who Advertise for Men: The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered. When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. (Others do not receive the slightest indication that their letters have even been received, much less given any consideration.) These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bona fide. We can guarantee that Every Advertisement Printed Is Duly Authorized. Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes. We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements. Classified Advertising Division, McGraw-Hill Publishing Company, "Put Yourself in the Place of the Other Fellow."

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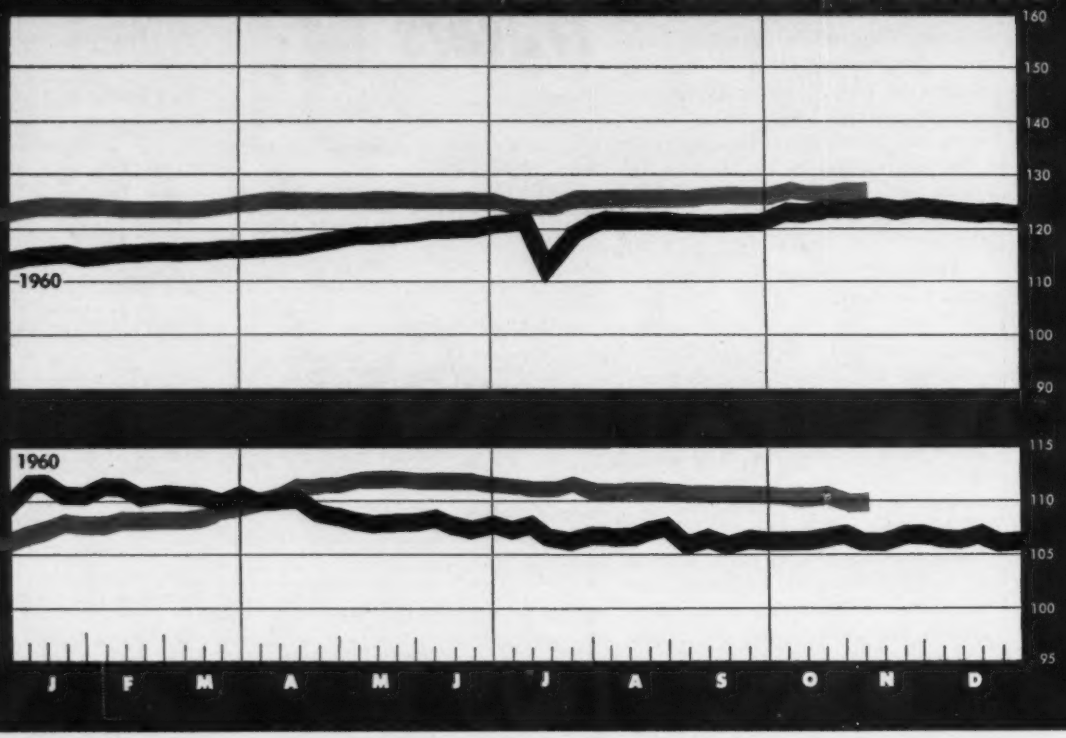
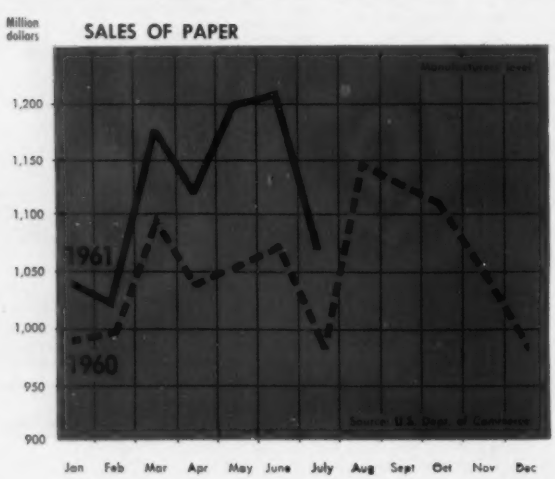


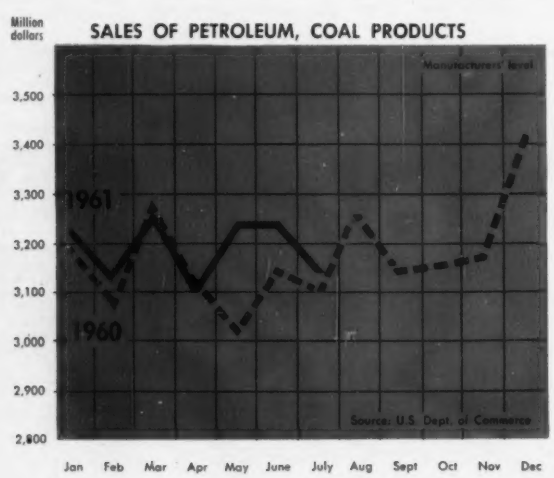
NOVEMBER 4, 1961

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1957=100)	126.2	126.0	125.0
Chemical Week wholesale price index (1947=100)	109.4	109.4	106.5
Stock price index (12 firms, Standard & Poor's)	53.45	53.10	44.15
Steel ingot output (thousand tons)	2,042	2,071	1,579
Electric power (million kilowatt-hours)	15,162	15,125	14,191
Crude oil and condensate (daily av., thousand bbls.)	7,118	7,153	6,771

PRODUCTION INDICATORS (1957=100 unadjusted)	Latest Month	Preceding Month	Year Ago
All manufacturing	113	111	108
Nondurable goods manufacturing	124	123	116
Durable goods manufacturing	106	102	102
Chemicals and allied products	130	123	122
Industrial chemicals	133	137	123
Petroleum and coal products	113	118	114

CHEMICAL CUSTOMERS CLOSE-UP





HOW TO MAKE A MOUNTAIN OUT OF A MOLECULE

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For example, in the plastics and synthetic fibres industries Sinclair petrochemicals are indispensable raw materials being used in the development of countless new and exciting products. Even when you add the new developments in paints, fertilizers, insecticides and detergents, you've only scratched the surface of profitable opportunities.

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ISOPRENE FROM REFINERY PROPYLENE

GOODYEAR-SCIENTIFIC DESIGN PROCESS

offers lowest cost route to rubber

MODERN RUBBER PLANTATION. First commercialization of the Goodyear-SD process is a large monomer-polymer plant included in the giant synthetic rubber complex — part of which is shown here — engineered and being built by SD for Goodyear at Beaumont, Texas.

Isoprene from propylene, the joint creation of The Goodyear Tire & Rubber Co. and Scientific Design Co., signals the start of big things for polyisoprene, chemistry's improvement over natural rubber. A monomer-polymer plant based on this exciting new process is the lowest cost route to rubber—synthetic or natural. Here's why:

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SD-209